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Holt  
Humbleyard  
Launditch  
Loddon  
Mitford  
Shropham  
Smithdon  
Taversham  
Tunstead  
Walsham  
Wayland  
Norwich Lil





to Reepham, as they are closely adjacent. Hackford is distinguished as Hackford-by-Reepham or sometimes Reepham-Hackford: it contains 820 acres, with a population, in 1831, of 698, one-fifth agricultural; Whitwell has 1530 acres, with a population, in 1831, of 483, two-thirds agricultural: in all 2920 acres, population 1633. The town is small, but it was formerly remarkable for having three churches, those of Reepham, Hackford, and Whitwell, in one churchyard. One of these, Hackford, was burned in the reign of Henry VIII.; the two others, Reepham and Whitwell, yet remain. The principal trade is in malt. The market is on Saturday, and there is a yearly fair. The living of Reepham is a rectory united with that of Kerdiston, of the joint clear yearly value of 699*l.*, with a glebe-house; that of Hackford or Reepham-Hackford is a rectory united with the vicarage of Whitwell, of the joint clear yearly value of 328*l.* There were in the three parishes, in 1833, one day-school, partly supported by subscription, with 36 children; seven other day-schools, with 126 children; and three Sunday-schools, with 137 children.

Stoke Ferry is in the hundred of Clackclose, 88 miles from London. The parish has an area of 1520 acres, with a population, in 1831, of 706, about one-third agricultural. The town consists of one principal street adjacent to the Wissey, over which there is a bridge. The church is toward the south end of the town. The market, which had been for a long period disused, has been revived within the last few years; it is now held on Friday, chiefly for corn. There is one yearly cattle-fair. Messrs. Whitbread and Co., the great brewers, have extensive malting establishments here. The living is a perpetual curacy, of the clear yearly value of 71*l.* There were in 1833 one day-school, partly supported by endowment, with 50 children, and two Sunday-schools, with 122 children.

Swaffham is in the hundred of South Greenhoe, 93 miles from London. The parish has an area of 8130 acres, with a population, in 1831, of 3285, about one-fourth agricultural. The town is situated on an eminence, and consists of four principal streets. The houses are generally well built, and the town has a neat theatre, an assembly-room, and a house of correction. The church, which is a large edifice in the form of a cross, consists of a nave with two aisles, a chancel, and two transept-chapels. It is the finest parish church in the neighbourhood. There is an embattled tower at the west end, with pinnacles at the corners, and a peal of eight bells; there is also a porch on the south side; the aisles are separated from the nave by fourteen arches, seven on each side, sustained by slender clustered pillars; and above them are twenty-six or twenty-eight light and elegant windows, two over each arch. In these windows are some fragments of stained glass. The roof is of finely carved oak; the church contains several monuments. There are several dissenting meeting-houses. The market is held on Saturday, and there are three fairs in the year. A great deal of butter is sold. The quarter-sessions for the county are held here by adjournment at Midsummer, and races and coursing-meetings are held on an extensive heath of some thousand acres near the town. The living is a vicarage united with the rectory of Threxton, of the joint yearly value of 738*l.*, with a glebe-house. There were, in 1833, one day-school, partly supported by endowment, with 15 boys; seven other day-schools, with 215 children; and two Sunday-schools, with 263 children.

North Walsham is in the hundred of Tunstead, 123 miles from London. The area of the parish is 4010 acres; the population, in 1831, was 2615, about one-third agricultural. The town stands on a gentle eminence above the river Ant, and consists of several streets irregularly laid out. The town was almost entirely burnt in the year 1600. A market-cross, erected in the time of Edward III., was repaired after the fire by Redman, bishop of Norwich. The church is a spacious and magnificent building, an early specimen of the perpendicular style. It has a fine south porch of flint and stone, and a richly carved wooden cover to the font. The tower fell down in 1724, and has remained in ruins ever since. There are several dissenting meeting-houses and a neat theatre. The silk manufacture is prosecuted on a very small scale; there is a weekly market on Thursday, a yearly cattle-fair, and two statute fairs in the year for hiring servants. A navigable canal, connected with the navigation of the Ant and Bure, opens a water communication between this town and Yarmouth. The living is a vicarage united with the rectory of Antingham St. Mary, of the clear yearly

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value of 336*l.*, with a glebe-house. There were, in 1833, thirteen boarding or day schools, with about 154 children; and three Sunday-schools, with 196 children.

New Walsingham is in the hundred of North Greenhoe, 113½ miles from London. The parishes of Great or Old Walsingham and of Little or New Walsingham adjoin each other; Old Walsingham has 2170 acres, with a population, in 1831, of 434, three-fourths agricultural; New Walsingham has 860 acres, with a population of 1004, about one-fourth agricultural: together 3030 acres; population 1438. A chapel was built at Old Walsingham, and dedicated to the Annunciation of our Lady, A.D. 1061, by the widow of Richoldis de Favarches. Geoffry, her son, in the reign of William the Conqueror, founded here a monastery for Augustinian or Black Canons, and erected a conventual church, giving to the monastery the chapel built by his mother. An image of the Virgin, belonging to this foundation, was held in the very highest regard; pilgrimages to the chapel or shrine of 'Our Lady of Walsingham' were even more frequent than those to the shrine of St. Thomas à Becket, and the possessions of the priory were augmented by large endowments or costly presents. Foreigners of all nations came hither on pilgrimage, and several kings and queens of England, among them Henry VIII. in the commencement of his reign, paid their devotions here. Erasmus, who visited it, has described the riches of the chapel. The monks persuaded the people that the Milky-way in the heavens was a miraculous indication of the road to this place, whence it came to be called by some 'the Walsingham way.' The convent at the suppression had a yearly revenue of 446*l.* 14*s.* 4*d.* gross, or 391*l.* 11*s.* 7*d.* clear, beside the offerings to our Lady, valued, according to one authority, at 260*l.* 12*s.* 4*d.* yearly, but by another at 26*l.* 15*s.* only.

There are some fine remains of the convent; a richly ornamented lofty arch, supposed to have formed the east end of the conventual church, the western entrance gateway to the monastery, having a broad flattened arch; the walls, with windows and arches of the refectory, 78 feet by 27, with walls 26½ feet high; a Norman arch with zigzag mouldings, which has been removed from its original site; part of the cloisters, incorporated with the modern mansion, a stone bath, and two uncovered wells, called 'the wishing wells,' yet remain. The principal part of these ruins are included in the pleasure-grounds of Walsingham abbey, the seat of H. L. Warner, Esq. There is a fine engraving of the eastern end of the church in the last edition of Dugdale's 'Monasticon.' There was a house of Franciscan or Grey Friars at Little Walsingham, the houses and gardens of which were valued at the dissolution at 3*l.* per annum; there was also a lazaret-house, founded A.D. 1492, for two leprous persons. This lazaret-house has been enlarged, and is used as a bridewell. The town of New Walsingham is near the river Stiffkey. The church, which is a spacious building, contains an ancient font of perpendicular character; its carving is among the richest in England, representing the seven sacraments of the Roman Catholic church and the Crucifixion. An engraving of this font is given in Britton's 'Architectural Antiquities,' vol. iv. There is a yearly fair. Quarter-sessions for the county are held here by adjournment twice in the year. There are Methodist and Independent meeting-houses. The living of Old Walsingham is a chapelry, of the clear yearly value of 168*l.*; that of New Walsingham, a donative, of the value of which there was no return. There were in the two parishes, in 1833, one endowed school, but without scholars; one school, with 12 girls, supported by private charity; seven other day-schools, with 161 children; one day and Sunday school, supported by voluntary contributions, with 37 girls; and four Sunday-schools, with 173 children.

Watton is in the hundred of Wayland, 91 miles from London. The area of the parish is 2000 acres; the population, in 1831, was 1027. The town, which is small, is in the midst of a dairy country, from which a considerable quantity of butter is sent to London. There are in the town some almshouses and a clock-tower. The church, which is at some distance from the town, has a round tower with an octangular top; it is supposed that some parts of the building are as old as the time of Henry I. There is a weekly market on Wednesday, three ancient fairs, and two others of modern establishment. Petty-sessions for the hundred are held monthly. The living is a vicarage, of the clear yearly value of 187*l.*, with a glebe-house. There were in

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the parish, in 1833, a national day and Sunday school, with 120 children, and three day-schools, with 93 children.

Wells is in North Greenhoe hundred, 118½ miles from London. The area of the parish is 2250 acres, with a population, in 1831, of 3624. The town is on a slight elevation rising above the marshy flat which here lines the coast, and about half a mile from the sea, on a creek, the mouth of which forms the harbour. The shifting sands render this harbour difficult of access, but considerable improvements have been made in it. The town consists of two principal streets, partially paved, and of some smaller streets. There is a custom-house on the quay; there is also a theatre. The trade of the port is considerable. Corn and malt are shipped; and coals, timber, deals, bark, oil-cake, tar, and wine are imported. There is a yearly fair. Petty-sessions for the hundred are held every fortnight. Several of the townsmen are engaged as seamen in registered vessels, or in the oyster or other fishery. The living is a rectory, of the clear yearly value of 738*l.*, with a glebe-house. There were in the parish, in 1833, six infant or dame schools, with 124 children; two endowed day-schools, with 60 children; two schools, supported by private charity, with 60 children; eight other day-schools, with 277 children; and two Sunday-schools, with 339 children.

Wymondham (pronounced and occasionally written Windham) is in Forehoe hundred, 100 miles from London. The parish comprehends six divisions, having an aggregate area of 11,240 acres, with a population, in 1831, of 5485. A priory of Black or Benedictine monks was established here before A.D. 1107, by William de Albini, chief butler to Henry I. It was at first a cell to St. Alban's abbey, but was separated from it and erected into an independent abbey about A.D. 1448. It had ten or twelve monks; the yearly revenue at the dissolution was 211*l.* 16*s.* 6½*d.* gross, or 72*l.* 5*s.* 4*d.* clear. The only part of the conventual buildings now remaining is a portion of the church, which is now used as the parish church. The town grew into importance through the monastery. Ket the Tanner, who raised a rebellion in the county in the reign of Edward VI., was a native of this town.

The town of Wymondham is of considerable extent, and has been much improved of late years. The church was originally cruciform, consisting of a nave with side aisles, the south aisle having the monks' lodgings over it, two chapels forming transepts, a choir, with Lady chapel on the north side, and a tower rising from the intersection of the nave and transepts. There were a chapter-house and other conventual buildings. Between the years 1410 and 1476 the inhabitants built another tower at the western end. The part now remaining consists of the nave with the side aisles (the south aisle having been rebuilt), the western tower, a considerable portion of the central tower, and some fragments of the walls of other parts. The architecture is of different styles and periods; the Norman arches of the nave may be regarded as belonging to the original building. There are several dissenting meeting-houses at Wymondham, and a house of correction. The bombazine manufacture is carried on to a considerable extent; the whole number of persons employed in it is probably near 1000. There are a market on Friday, two yearly fairs for horses and cattle, and occasional statute fairs for hiring servants. The living is a vicarage, of the clear yearly value of 515*l.*, with a glebe-house. There were, in 1833, two day-schools, partly supported by an endowment, with 140 children; three other day-schools, with 110 children; and five Sunday-schools, with 599 children. There is an endowment for a free grammar-school, but the Report in 1833 states that 'there had been no child instructed therein for many years.'

Of the places formerly of note, but now decayed, may be mentioned North Elmham in Launditch hundred, 5 miles north of East Dereham. In the Saxon time this was for four centuries (A.D. 673-1075) the seat of a bishopric; and after the see was removed to Thetford, and subsequently to Norwich, the bishops continued to reside occasionally in the manor-house here, which bishop Spencer, in the time of Richard II., obtained leave to convert into a castle. The entrenchment surrounding this castle still remains, and encloses about five acres of land. There are a few remains of the palace overgrown with briars and thorns, and some traces of the cathedral. The parish has an area of 5000 acres, with a population, in 1831, of 1153. The living is a vicarage, of the clear yearly value of 316*l.* The see was

formed by dismemberment from that of Dunwich. The two sees were reunited probably about 870 or 871.

Castle Acre is in the hundred of Freebridge Lynn, 4 miles north of Swaffham, on the north bank of the Nar. It is probable that this was a Roman station, for several coins and a tessellated pavement have been dug up here. The castle, from which the place probably gets its name, was erected by William earl of Warren and Surrey, to whom the lordship had been granted by the Conqueror. It occupied the southern side of a hill sloping toward the river, and consisted of three parts or divisions, each fortified with mounds, ditches, and walls, but connected with each other. The earthworks remain, as well as fragments of the building. The principal street of the present village passes through one of the main entrances of the castle; this entrance consists of an outer and inner gate, with a portcullis between them, and two circular bastions to defend the approach. There are traces of a similar entrance at the southern end of the street. Earl Warren founded also a priory of Cluniac monks near his castle; the yearly revenues of which priory at the dissolution were estimated at 324*l.* 17*s.* 5½*d.* gross, or 306*l.* 11*s.* 4½*d.* clear. There are considerable remains of this religious house. The ruins of the west front of the church and the towers at the angles are a fine specimen of enriched Norman architecture. There are three doorways in this front; the central and principal one has a number of fine zigzag and other mouldings. The large west window over this doorway forms an exception to the general character of the front, being of perpendicular architecture, but much mutilated; there are pointed arches, or remains of them, on each side of this large window. Some large columns of the nave, but only one in a perfect state, the walls of the transepts, and considerable remnants of the conventual buildings to the south of the church, of the prior's house adjacent to the south-western angle of the church, of the porter's lodge, and of the barn of the monastery, are remaining. The site of the monastery within what may be called the walled precinct contains nearly thirty acres. The village of Castle Acre is still considerable. The area of the parish is 3210 acres; the population, in 1831, was 1333. There are two dissenting places of worship, and in 1833 there were three day-schools, with 125 children, and three Sunday-schools, with 225 children. The living is a vicarage, of the yearly value of which no return has been made. There are two yearly fairs, and the magistrates hold a meeting here once a fortnight.

Castle Rising, also in the hundred of Freebridge Lynn, 5 miles north-west of Lynn, and 2 miles from the Wash, on the Rising or Habingly river, is a place of great antiquity; an old verse, preserved by tradition, declares that 'Rising was a seaport town when Lynn was but a marsh.' It is thought that Alfred the Great built a castle here; at any rate William de Albini, to whose ancestors the Conqueror gave several lordships in the county, built a castle here before 1176; and this edifice appears to enclose a fragment of a more antient building. The trade of the place was considerable, and the town was incorporated, but at what period is not clear; however, the harbour, being choked up with sand, was deserted, and the place fell into decay. It received the elective franchise in the time of Philip and Mary; but from the decay of the town the number of voters was diminished to two or three, when the franchise was taken away by the Reform Act. The corporation has almost dwindled away. The parish and borough contains 2330 acres, with a population, in 1831, of 358, more than half agricultural. There are considerable remains of the castle; the keep is standing, though much dilapidated; the walls are three yards thick, and the division and arrangement of the apartments are very obvious. It stands in a baillium or court surrounded by a moat and embankment. The general style of the building is Norman, and bears a resemblance to that of Norwich castle. Isabella of France, queen of Edward II., was kept in confinement in this castle by her son Edward III., from A.D. 1330 till her death in 1358. The church is a very antient structure; the west front is of remarkably fine Norman composition; it has a fine doorway with varied mouldings, and a large window above, with a series of intersecting arches on each side. The font is antient and highly ornamented. The living is a rectory consolidated with that of Roydon, of the clear yearly value of 419*l.*, with a glebe-house. There were, in 1833, two day-schools, with 67 children, and two Sunday-schools, with 61 children.

Kenninghall, in Guiltcross hundred, in the neighbourhood of East Harling, is on the Ikeneld Street, and was once a residence of the princes of East Anglia, from which circumstance it derives its name, Cyning-Halla, 'King's Hall' or palace. The site of this palace, which is still discernible, is called 'Candleyards,' a corruption probably of Cyning-hall-yards, and consists of an area of four acres, surrounded by a ditch, and having an artificial mound at each corner. The lordship was conferred by the Conqueror on William de Albini, from whose family it descended to the Montalts, the Mowbrays, and the Howards. The splendid manorial residence of these nobles was forfeited to the crown on the attainder of the duke of Norfolk in the time of king Henry VIII., by whom it was conferred on his daughter the princess Mary, who, as well as her sister Elizabeth, occasionally resided here: it is now pulled down. The church, which is antient, has a south door of very singular Norman composition. The market of Kenninghall has been for many years discontinued. The area of the parish is 3660 acres; the population, in 1831, was 1251, more than half agricultural. The living is a vicarage, of the clear yearly value of 250*l.*, with a glebe-house. There were, in 1833, two boarding and day schools, with 55 children; three day-schools, with 76 children; and two Sunday-schools, with 260 children.

Litcham is in Launditch hundred, 8 miles north-west of East Dereham. The area of the parish is 2060 acres; the population, in 1831, was 771, more than a third agricultural. It was formerly a market-town, but the market has been discontinued; the place however still continues to be the mart of the surrounding villages. The church is an antient structure. There were, in 1833, one day-school, partly supported by subscription, with 70 children; one other day-school, with 20 children; one boarding-school, with 10 children; and one Sunday-school, with 50 children.

Methwold is in Grimshoe hundred, between Brandon and Stoke Ferry. The parish has an area of 13,530 acres, with a population, in 1831, of 1266, about three-fourths agricultural. The market has fallen into disuse. There are a handsome church with an embattled tower, and a Methodist meeting-house. The living is a vicarage united with the rectory of Cranwich or Cranwick, of the clear yearly value of 450*l.*, with a glebe-house. There were, in 1833, one day-school, with 36 children, supported by the duchy of Lancaster; one day and Sunday school, with 16 children in the week and about 22 on Sundays, partly supported by private charity; and one Sunday-school with 217 children.

Snettisham is in Smithdon hundred, about 11½ miles north by east of Lynn, not far from the Wash. The area of the parish is 5580 acres, with a population, in 1831, of 926, nearly two-thirds agricultural. The market has been discontinued. There are a church and a Methodist meeting-house. Several brass 'celts,' antient instruments of disputed origin and use, have been dug up in this neighbourhood. The living is a rectory, of the clear yearly value of 110*l.*, with a glebe-house. There were, in 1833, one endowed school with 35 children; a school, partly supported by charity, for 47 girls; five other day-schools, with 81 children; one boarding school, with 23 children; and two Sunday-schools, with 73 children.

Worsted is in Tunstead hundred, 12 miles north-north-east of Norwich. The area of the parish is 2410 acres; the population in 1831 was 830, more than half agricultural. This place was formerly the seat of a considerable manufacture, introduced by the Flemings, of woollen twists and stuffs, called from it 'Worsted goods;' but this manufacture was in the reigns of Richard II. and Henry IV. removed to Norwich, where indeed it had been previously established. The market has been discontinued; and the town has now scarcely any manufacture and little trade, though the latter is facilitated by the canal from the river Ant up to North Walsham, which passes near the town. The church is a fine building, consisting of nave, chancel, and tower: the nave and chancel are partly of decorated, but chiefly of perpendicular character; the tower is of decorated character, and is of very admirable arrangement and composition. It is strengthened by rich buttresses and is crowned with pinnacles. There is in the church a font of peculiar richness with delicately pannelled sides; the pedestal has niches and buttresses, and the risers of the steps are pannelled. The cover of this font is of wood, of rich 'tabernacle work.' There is also a fine wooden screen. The living is a vicarage, of the clear yearly value

of 251*l.* There were in the parish, in 1833, five day-schools, with 87 children, and two Sunday-schools, with 134 children.

The villages require only very slight notice. Banham (pop. in 1831, 1297) is in Guiltcross hundred, about 2 miles north-east of Kenninghall: it has a small endowment for a school. Blofield (pop. 1092) is in Blofield hundred, 7 miles from Norwich on the road to Yarmouth. It has several schools, one supported by endowment, another by private charity. Coltishall (pop. 868) is in South Erpingham hundred, on the river Bure, 7 miles from Norwich on the road to North Walsham: it has an endowed free-school. Costessey (popularly Cossey) (pop. 1098) is in Forehoe hundred, on the river Wensom, 4 miles from Norwich. It has the fine seat and park of Costessey Hall, the seat of Jerningham lord Stafford. The house is partly antient, partly modern. Contiguous to the house is a handsome Gothic chapel, erected by Edward Jerningham, Esq., a branch of the family. Feltwell (pop. 1231) is in Grimshoe hundred, about 2 miles south of Methwold. It consists of two antient parishes consolidated. Gaywood (pop. 924) is in the hundred of Farebridge Lynn, about a mile from Lynn, and consists of a principal street on the road to Swaffham. It has a large national school. The church serves for the adjoining parish of Bawsey, as well as for Gaywood. Mattishall (pop. 1093) is in Mitford hundred, 11 miles west of Norwich: some manufacture, probably of Norwich stuffs, is carried on. Stripdarn (pop. 1889) is also in Mitford hundred, between East Dereham and Watton. There is an endowed school here. It has a handsome church. Upwell (pop., including the chapelry of Welney, 4156, on an area of 22,360 acres) is partly in Clackclose hundred, partly in Wisbeach hundred, Cambridgeshire, chiefly in the former. The village is on a branch of the river Nene, which here forms the boundary between the two counties. There are large garden-grounds in the neighbourhood. The church is on the Norfolk side of the stream. There are a Methodist meeting-house and a charity-school. Walsoken (pop. 1856, on an area of 8800 acres) is in Freebridge Marshland hundred, in the immediate neighbourhood of Wisbeach, to the inhabitants of which the pleasant walks round the village offer an agreeable promenade. Walsoken, with the neighbouring villages of Walton and Walpole, derives its name from its situation, adjacent to an old Roman wall or embankment for securing the country against the inundation of the sea.

*Divisions for Ecclesiastical and Legal purposes.*—This county is included in the diocese of Norwich, which comprehends Norfolk, Suffolk, and a few parishes in Cambridgeshire. [NORWICH DIOCESE OF.] Norfolk is divided between the two archdeacons of I. Norwich and II. Norfolk. I. The archdeaconry of Norwich includes the eleven rural deaneries of—1, Blofield, 2, Breckles, 3, Brisley, 4, Flegg, 5, Holt, 6, Ingworth, 7, Lynn, 8, Taverham, 9, Thetford, 10, Toftrees, and 11, Walsingham. Of these it is proposed that the deanery of Lynn shall be added to the diocese of Ely. II. The archdeaconry of Norfolk includes the thirteen rural deaneries of—1, Brooke, 2, Burnham, 3, Cranwisse, or Cranwich, 4, Depwade, 5, Fincham, 6, Hingham, 7, Hitcham, 8, Humbleyard, 9, Reddenhall, 10, Repps, 11, Rockland, 12, Sparham, and 13, Waxton. Of these, it is proposed that Fincham should be added to the diocese of Ely. In Browne Willis's enumeration there are 354 churches and chapels in the former of the two archdeacons, and 446 in the latter making just 800 in the whole county. In Lewis's 'Topographical Dictionary,' the number of parishes is given at 756; of which 441 are rectories, 171 vicarages, and 78 perpetual curacies; the remaining 66 are not specified.

Norfolk is in the Norfolk circuit, and the assizes are held at Norwich. The quarter-sessions are held at Norwich; from thence the Epiphany, Easter, and Michaelmas sessions are adjourned to King's Lynn, the Midsummer sessions to Swaffham; the Epiphany and Midsummer sessions are further adjourned to Walsingham; the Easter and Michaelmas sessions to Holt.

The county gaol is at Norwich, adjacent to the keep of the castle. The old prison, restricted to the walls of the antient fortress, having been found insufficient for the increasing number of prisoners, the new gaol adjoining it was erected in 1824, at an expense of 50,000*l.* It consists of a keeper's house of octagonal form and three radiating wings. The site is not considered to be well chosen, the sun and air being obstructed by the dense mass of the old castle, and the various buildings are



too much crowded together. The discipline of the gaol (by Report of Inspector, Feb. 1, 1836) was considered too lax: but the defects of management result in a great degree from the inconvenient construction and arrangement of the prison. There are houses of correction at Swaffham, Little Walsingham, and Wymondham. There are borough gaols at Norwich, Yarmouth, King's Lynn, and Thetford. The number of prisoners for the county, committed from October in the year 1833 to October in the year 1834, was 1757, viz. 842 to Norwich Castle, 346 to Swaffham, 467 to Little Walsingham, and 102 to Wymondham; in 1834-5, 1665, viz. 801 to Norwich, 333 to Swaffham, 425 to Little Walsingham, and 106 to Wymondham; and in 1835-6, 1541, viz. 718 to Norwich, 287 to Swaffham, 427 to Little Walsingham, and 109 to Wymondham. There is a County Lunatic Asylum, established in May, 1814; into which, from its establishment, up to May 1, 1836, 1020 patients had been admitted. The amount of expenditure for the county rates in 1834 was 15,875*l.* 13*s.* 2*d.*, the greater part by far being expended in the prosecution of criminals, maintenance of prisoners, and other charges connected with the administration of justice.

The maritime jurisdiction of the county is under the direction of the vice-admiral of Norfolk, an officer appointed under a commission from the lords of the Admiralty, who is invested with a power to hold a Court of Admiralty for the county, with judges, marshals, and other officers. An appeal lies from this court to the high Admiralty Court. A court for the liberty of the duchy of Lancaster (of the limits of which in this county we are not aware) is held at Aylsham. A court for the liberty of the duchy of Norfolk is held at Lopham, or elsewhere within the liberty, at the discretion of the duke. The extent of this liberty is considerable, and reaches beyond this county. It comprises the whole hundred of Earsham, the half-hundred of Guiltecross, several manors and demesnes in other parts of the county, and several parishes or demesnes in Suffolk, Sussex, Surrey, and in other parts of the kingdom. Within these limits the duke has the return of all writs, bills, summonses, precepts, and mandates of the king, and exercises various other rights. The court of the honour of Rhye is kept at Hingham, and that of the fee or capital lordship of Richmond, at Swaffham.

Before the passing of the Reform Act, twelve members were returned from Norfolk: two for the county, two for the city of Norwich, and two each for the boroughs of Yarmouth, Castle Rising, Lynn, and Thetford. The total number was not affected by that act; the two members lost by the disfranchisement of Castle Rising being counterbalanced by the addition of two members consequent on the division of the county. The eastern division of the county includes the eighteen hundreds of Blofield, Clavering, Depwade, Diss, Earsham, North Erpingham, South Erpingham, Eynsford, East Flegg, West Flegg, Forehoe, Happing, Henstead, Humbleyard, Loddon, Taversham, Tunstead, and Walsham. The court for the election of members is held at Norwich; and the polling-stations are Norwich, Yarmouth, Reepham, North Walsham, and Long Stratton. The western division of the county comprehends the fifteen hundreds of Brothercross, Clackclose, Freebridge Lynn, Freebridge Marshland, Gallow, North Greenhoe, South Greenhoe, Grimshoe, Guiltecross, Holt, Launditch, Mitford, Shropham, Smithdon, and Wayland. The court for the election of members is held at Swaffham; and the polling-stations are Swaffham, Downham, Fakenham, Lynn, Thetford, and East Dereham. The boundaries of the city of Norwich and of the several boroughs were not altered, except by the incorporation with Norwich of some extraparochial districts, and the addition of the whole of the parish of Gorleston in Suffolk to the borough of Yarmouth, only a portion of that parish having been included in the old borough boundary.

*History; Antiquities.*—Norfolk formed part of the dominions of the Iceni or Simeni (Σιμενοι, Ptol.), a people who allied themselves with the Romans in the time of Claudius, but rose in arms on the attempt of Ostorius to form a line of fortified posts along the Severn, the Warwickshire Avon, and the Nene. This hasty rising was vigorously put down by that active commander. [BRITANNIA.] The more terrible rising under Boadicea followed [BOADICEA]; but on her defeat the Iceni seem to have submitted. In the Roman division of Britain, Norfolk was included in the province of Flavia Cæsariensis, which comprehended all the east side and the centre of the island. There were many British and

Roman towns or posts in this county, several of which were on the shores of that estuary, which we have noticed as occupying the valleys of the Wensum, the Yare, the Waveney, the Bure, and the district of the 'broads.' Venta (Ὠβεντα, Ptol.), distinguished as Venta Icenorum from several other British towns to which the name of Venta was common, was probably at Caistor St. Edmund's, about 3 miles south of Norwich, and was the chief town of the Iceni. Branodunum and Gariannonum, mentioned in the 'Notitia Imperii,' were probably in this county; the former at Brancaster, the latter on the valley (then the estuary) of the Waveney; and Ad Taurum, mentioned in the Peutinger Table, was probably at Taesburgh, on a branch of the Yare. There are traces of several other posts, of which the names are unknown. The Iciani of the Antonine Itinerary has been placed by some antiquaries at Thetford or Ickburgh, between Brandon and Swaffham. The mouth of the great estuary, where Yarmouth now stands, is mentioned by Ptolemy under the name Garryenus (Γαρρηνεος), the first part of which evidently embodies the root of its present designation 'Yare.'

Of Venta there are some remains on the right bank of the Taes, which joins the Yare. The Romans made it their principal post on this side of the island. There are traces of this station, which comprehended a square of about 30 acres. Foundations of buildings may be traced, and sepulchral urns and other antiquities have been dug up. The station is on a declivity toward the river: its figure approximates to a parallelogram with the corners rounded off: it was enclosed by a single rampart or mound, surmounted by a wall and defended by a ditch. There was formerly a raised mound in each corner. Of a massy tower near the river, designed to guard the gate toward the water, there are considerable remains: it is still above thirty feet high, and is composed of alternate layers of Roman bricks and of flint, imbedded in a strong cement: the outside was probably once faced with stone. The wall which surmounted the mound appears to have been built in the same manner. Many Roman bricks have been used in the erection of the parish church, which stands within the station, as the now ruined church at Reculver in Kent stands within the enclosure of the Roman Regulbium. Venta appears to have been on one of the branches of the great estuary. Of Branodunum (Brancaster, 4 miles north-west of Burnham-market), one of the stations of the cavalry under the 'Comes Littoris Saxonici' (Count of the Saxon Coast), there are some remains. The station was just at the foot of the declivity that overlooks the marshes: the area was about eight acres. Numerous coins, urns, knives, 'styles' for writing, and other antiquities have been dug up. The site of Gariannonum, another of the posts of cavalry under the same officer, has been much disputed. Spelman proposed to fix it at Caistor, at the northern end of the 'denes' or flats along the shore by Yarmouth, from which town Caistor is distant about 2 miles. But although the name would lead us to fix a Roman post here, yet it is unlikely to have been a post for cavalry, or the chief station of the district. Burgh castle in Suffolk, at the junction of the Waveney and the Yare, has been fixed upon by most antiquaries; but though the remains show it to have been a fortification of importance [BURGH], it could hardly have been suited, situated as it then was on an island, for a post of cavalry. Another locality has consequently been proposed, viz. Whetacre or Whitaker Burgh, on the Norfolk side of the Waveney, on the extreme point of the peninsula formed by the two great branches of the estuary, now the valleys of the Waveney and the Yare. (Robberds's *Geological and Historical Observations on the Eastern Valleys of Norfolk*.)

Ickburgh, 4 miles east of Methwold, bears in its name an indication of having been a Roman post; and from the first syllable it has been proposed to identify it with the Iciani of Antoninus: but the uncertainty of the connected stations, and the occurrence of the same element in several other names, for example Ixworth, makes it difficult to determine. The discovery of various antiquities at North Elmham, and the early importance of that place under the Saxons, lead to the supposition of its having been a Roman town or village.

The names of some places, as Attleburgh, on the road between Thetford and Norwich; Burgh, near Aylsham, in the neighbourhood of which, at Oxnead, antiquities have been discovered; Happisburgh, on the coast between Yarmouth and Cromer; Oxburgh (where are the remains of a ditch and fortification), on the Wissey, near Stoke Ferry; and the discovery of antiquities at other places,

as at Buxton, between Aylsham and Coltishall, Castle Rising; South Creak, between Burnham and Fakenham; Narborough and Narford, 5 miles north-west of Swaffham; Old Walsingham; and West Acre, near Castle Acre, render it probable that they had a Roman origin; and it may be observed that nearly all of them are on the sea or on the verge of those marshy valleys which line the banks of the chief rivers, and which, whether belonging to the system of the Yare or the Ouse, we have every reason to think were æstuaries in the time of the Romans.

There are traces in the county of Roman or other ancient roads. A road, nearly coinciding with the Norwich mail road, ran from the neighbourhood of Diss to Venta Icenorum or Caistor. This is marked in Donald and Milne's 'Map of Norfolk' as the 'Pye Road.' Another from Ixworth in Suffolk ran in nearly a direct line by Castle Acre to Holme, near St. Edmund's Point or Brancaster. This is called the Iedder or Peddar's Way. A third road ran from Venta (Caistor) or Ad Taum (Tasburgh), across the valley or æstuary of the Waveney at Bungay; this is called by Donald and Milne 'Stone Street.' The Ikeneld Street crossed the Little Ouse above Thetford, and ran in the direction of Venta. Other roads ran from Venta by Burgh, near Aylsham, to the coast near Cromer; another from the same place to Brancaster; a third westward from Venta across the Great Ouse and the Nene into the Midland counties; and a fourth by Burgh Apton near Lodon, in the direction of Whetacre Burgh, probably the Roman Gariannonum.

It has been inferred with considerable probability that the Saxons had obtained a settlement on parts of the east and south coasts of this island before the overthrow of the Roman empire. 'This district,' says Sir F. Palgrave, 'in the last ages of the Roman empire was placed under the command of a military count, called "Comes Littoris Saxonici." It has been supposed that this shore was so called merely because it was open to the incursions of the Saxons; but it is most probable that they, like the Scots, succeeded in fixing themselves in some portion of the district, for it appears a strange anomaly that a country should be named not from its inhabitants but from its assailants; and in the "Iittus Saxonium" of Gaul they had obtained a permanent domicile not far from Bayeux.' ('History of England,' in the *Family Library*.) This early settlement of the Saxons was probably chiefly in the counties of Norfolk and Suffolk, and perhaps Essex, and will serve to account for some circumstances in the subsequent history of those districts which are otherwise unaccountable.

The time of this settlement can only be conjectured; the most probable period was the usurpation of Carausius in this island, during the reign of Diocletian and Maximian in the other parts of the Roman empire. Carausius was himself a seaman and cultivated the alliance of the Saxons, and employed them in the fleet by which he long bade defiance to the power of the emperors. It is not unlikely that to him may be ascribed the erection of those forts in Norfolk and Suffolk called 'burgi,' or towers, which at once restrained his barbarous allies and defended the æstuaries and coast from attack; and of which traces remain in the frequent occurrence of the Teutonic termination 'burgh.' The subsequent usurpers who arose in Britain probably encouraged new settlements of Saxons, whose warlike habits rendered them serviceable soldiers in the bloody contests then carried on.

In the general conquest of England by the Saxons and their kindred tribes, Norfolk and Suffolk and some parts of the adjacent counties were formed into the kingdom of East Anglia, constituted probably by the coalition of the independent settlements of the 'North folk' and the 'South folk,' that is, of the people north and south of the æstuaries of the Waveney and the Little Ouse.

The settlement of the Angles here (A.D. 527) was attended by many battles, but the contest does not appear to have been protracted or severe, and in a very few years (A.D. 534) the barbarians were sufficiently strong to invade the banks of the Rhine, and furnish the only instance upon record of the insular Saxons assailing the Continent. This comparatively easy formation of an extensive state, and the early development of its aggressive power, can only be accounted for by the supposition that the founders of the East Anglian settlements landed on a coast already settled by men of the same origin and of kindred habits; it may be received then

as a corroboration of the conjecture that Carausius or some other ruler had already located the Saxons here.

The history of the East Anglian expedition to the Continent (A.D. 534-47) is singular. The hand of an East Anglian princess had been solicited by the Prince of the Varnians, who lived somewhere between the Rhine and the North Sea. Political reasons led the Varnian to reject the lady whom he had wooed, in order to marry his father's widow, a Frankish princess. The rejected fair one, supported by her countrymen, invaded his territories, defeated his army, took him prisoner, and compelled him to repudiate his Frankish wife and fulfil his first engagement.

It was not till some years after this that the settlements of the East Angles were consolidated into a monarchy. Uffa was the first who is spoken of as king of East Anglia, about A.D. 571. His successors were called from him Uffingas, popularly corrupted in an after-age into Fikeys. Under his grandson Redwald, East Anglia became a powerful state. Redwald protected Edwin the fugitive prince of Deira; and taking arms on his behalf, defeated and slew Ethelfrith of Bernicia, who had expelled Edwin and seized his kingdom. Redwald became bretwalda, or supreme head of the Anglo-Saxons. He had embraced Christianity, but was not able to introduce it into his dominions except by a compromise with the hereditary idolatry of his subjects; and Christ and Odin were worshipped in the same temple. Eorpwald and Sigebert, the sons of Redwald, who successively ascended the throne, succeeded in establishing Christianity. Sigebert was an encourager of learning, and founded a school, which some consider to have been the germ of the university of Cambridge. East Anglia however ceased to be a powerful kingdom; it became subject to the supremacy of Edwin, now bretwalda, or head of the Anglo-Saxons.

Sigebert had just abdicated his throne and retired to a monastery (A.D. 633) when his successor Egeric or Egrie, brother of Redwald, who had previously ruled over a part of the kingdom, was attacked by Penda of Mercia. The East Angles by main force drew Sigebert from his retreat and compelled him to accompany them to the field, hoping for victory under the guidance of so pious a prince. They were defeated; and Sigebert, who refused to bear arms and carried only a white wand, was slain, as well as Egrie. Annas, nephew of Redwald, succeeded, but he too was many years afterwards killed by Penda (A.D. 654). His brother and successor Ethelhere, accompanying Penda in his attack upon Oswio of Northumberland, was with him defeated and slain in Winwidfield, or the plain of the river Winwid, near Leeds in Yorkshire (A.D. 655). Some obscure princes, of whom the names are barely known, succeeded; but in 792, Ethelbert or Agelbriht, a prince of greater reputation, was king. He visited the court of Offa, the powerful king of Mercia, to solicit the hand of his daughter, but was murdered by the Mercian king, at the instigation of his wife (A.D. 792), and his kingdom annexed to Mercia. The Mercian power was not sufficient to repress anarchy, which was probably promoted by the disjointed nature of East Anglia, consisting of peninsulas and islands, separated by arms of the sea, and probably inhabited by a race maintaining more of their original character than the other Anglo-Saxons. On the defeat of the Mercians by Egbert, they rose in arms to assert their independence, and Beornwulf and Ludican, kings of Mercia, were successively defeated and slain by them. They appear however to have submitted quietly to the supremacy of Egbert.

Shortly before the death of Ethelwulf, A.D. 855, Edmund was crowned king of East Anglia at a place called, by Asser, Burva. According to the chronicles he was of the 'old race of the Saxons' in Germany; and Hunstanton, near St. Edmund's Point, on the north-west coast of the county, is named as the spot on which he landed. One of the accounts of Ragnar Lodbrog, the Danish pirate, places the scene of his catastrophe in East Anglia. The tradition is that he was driven in a boat, in which he was hawking off the Danish coast, by stress of weather over to England; and entering the æstuary of the Yare, landed at Reedham, a village between Yarmouth and Norwich. The inhabitants brought him to the court of Edmund at Caistor, where he was murdered by Bern, the king's huntsman, without his master's knowledge. His death led to the subsequent invasion of East Anglia by the Danes. (Spelman's '*Icenia*,' quoted in Swinden's *History of Great Yarmouth*.) The more generally received account however places the scene of Ragnar's death in Northumberland, and ascribes it to the orders of Ella, king of that country. (Turner's *Anglo-Saxons*.)

In the great invasion of England by the Danes, or Northmen, under the sons and kinsmen of Lodbrog, East Anglia was the first part attacked. The Northmen landed and formed a camp, in which they passed the winter, demanding and receiving from the East Anglians a supply of horses (A.D. 866).

The nature of the country, its insular or peninsular character, and its separation by æstuaries and marshes from the more civilized parts of the Anglo-Saxon territories, had probably led the East Angles to retain a larger portion of their primitive character, superstitions, and habits; and this enabled and disposed them to coalesce with invaders in whose character and mode of life they would only behold a renewal of what they themselves had been. William of Malmesbury (*De Gestis Reg. Anglor.*, lib. ii., cap. 5) says, 'Orientales Angli et Northanimbri cum Danis unam ingentem coaluerunt.' It is probable indeed that from the first settlement of the barbarian allies of Carausius, the character of the inhabitants of this district had undergone comparatively little change, and hence the facility with which new swarms of barbarians were received and naturalised. In A.D. 870 the Danes returned and established themselves at Thetford. Edmund fell in an attempt to expel them. He was canonised, and has given name to St. Edmund's Bury. The dominion of the invaders became permanent. In the peace made between Alfred and Guthrun or Godrun (A.D. 883), this county was included in the Danelage or Danelagh, and though subject to the supremacy of the Anglo-Saxon kings, became Danish in its character and probably in its language, so far as this differed from the Anglo-Saxon.

Among the characteristics still remaining of Danish possession may be noticed the frequent recurrence of the termination *by*, in such names as Filby, Ormesby, Scraby, Thrigby, &c., villages in the country round Yarmouth; and perhaps the frequency of the termination *oe* or *hoe*, an island, in such names as Hadiscoe, Limpenhoe, villages in the same parts of the county, and in the names of the hundreds Forehoe, Greenhoe, and Grimshoe; there is also in the names Worsted, Tunsted, &c. the termination *sted*, which is common in Holstein and Angeln.

The submission of the East Angles to the Anglo-Saxon supremacy was unsteady. They failed in their engagements to Alfred, when he was attacked by the redoubted Hastings, A.D. 893. At the commencement of the reign of Edward the Elder (A.D. 905), they supported his competitor Ethelwald; and Eohric or Eric, a Danish chieftain of East Anglia, fell with Ethelwald in an attack upon the Kentish men in Edward's army. A treaty of peace between the East Angles and Edward was made a year or two after; and (A.D. 921) the direct sovereignty of the country appears to have passed into Edward's hands by the willing act of the people, after he had defeated some of the Anglo-Danes at Temesford in Bedfordshire, in which battle an East Anglian king or chieftain fell. William of Malmesbury speaks of the expulsion of the East Anglian Danes, 'expulsis Danis,' but this expression is to be understood not of the Danes generally, who had probably merged in the body of the inhabitants, but only of those who were unwilling to submit to the Anglo-Saxon government.

Under the Anglo-Saxon princes, East Anglia was governed by Ealdormen. Athelstan, of the blood royal, with his sons Ethelwold or Ethelwulf (who was slain by King Edgar, in order that he might marry his wife Elfeda) and Ailwin or Ethelwin, were Ealdormen of East Anglia.

When the struggle between the Anglo-Saxons and the Danes was renewed in the reign of Ethelred II., the East Angles equipped a fleet for the defence of the island, a circumstance which indicates that they had not lost their maritime habits. At a subsequent period (A.D. 1004) East Anglia was attacked by Sweyn, king of Denmark, who brought his fleet up to Norwich, which he plundered and burnt. Ulfketul or Ulfkyttle, a man of Danish extraction, was Ealdorman of East Anglia at the time. He, being unprepared to repel the attack, first attempted negotiation, but finding that fail, he resorted to force, and defeated the invaders, who had taken and burnt Thetford. The victory was dearly bought, and the Danes, though with difficulty, escaped to their ships. In A.D. 1010, the Danes, under their leader Thurkill or Turketal, occupied East Anglia, and obtained a portion of it (probably Suffolk) in permanency by making peace with Ethelred. Ulfkyttle, who probably had retained Norfolk and other parts in the east of the island, fell in the battle of Assandren (A.D. 1016) between

Edmund Ironside and Canute the Dane. In the subsequent division of the island between these princes, East Anglia fell to the former. On the death of Edmund and the accession of Canute to the sovereignty of England, Thurkill was appointed (A.D. 1017) earl (a title of Danish origin, equivalent to the Saxon Ealdorman) of the whole of East Anglia, but was soon afterwards (A.D. 1021) banished, and in his exile was killed by the peasantry of Denmark. In the reign of Edward the Confessor, the earldom of East Anglia was held by Harold, afterwards king; but when Harold, with his father and brethren, was declared an outlaw (A.D. 1051), his earldom was given to Algar, the son of Leofric, earl of Mercia. On the restoration of Harold (A.D. 1052) he resumed his earldom, but resigned it again to Algar, upon receiving the earldom of Wessex on the death of his father, earl Godwin (A.D. 1053). Two years later Algar was driven into banishment, but restored a year after. However, in A.D. 1057 he finally resigned the earldom of East Anglia for that of Chester; and East Anglia perhaps reverted to the possession of Harold, whose brother Gurth became earl of Suffolk. The limits of the kingdom and earldom of East Anglia were probably coincident with those of the East Anglian bishopric, the seat of which has long been fixed at Norwich. Its first seat was at Silthestow, afterwards called Domnoc or Dommoc, now Dunwich in Suffolk, where it was established by Sigebert, king of the East Angles, about the middle of the seventh century. In A.D. 673 the diocese was divided, a bishopric being established at North Elmham in Norfolk. About A.D. 870 or 871 the diocese was reunited under the bishop of Elmham; in A.D. 1075 the see was transferred to Thetford, and about A.D. 1094 to Norwich, where it has ever since remained.

After the Conquest the earldom of Norfolk and Suffolk was bestowed on Ralf de Guader, one of William's Breton auxiliaries according to some accounts, but according to others a native of Norfolk; but he having rebelled, was besieged in Norwich castle, and being forced to surrender, was banished, and the earldom of Norfolk bestowed on Roger Bigod, another of the companions of the Conqueror. On the death of William, Roger supported the claim of his eldest son Robert to the throne, which led to the devastation of the county. Bigod was obliged to submit to William Rufus. Hugh Bigod, one of the successors of Roger in his earldom, supported Stephen, who revived in his favour the title of earl of East Anglia. In the rebellion of the children of Henry II. against their father (A.D. 1177), Norfolk was the scene of contest; Hugh Bigod being a supporter of the young princes: he died attainted of treason. His son John succeeded to his father's title after payment of a heavy sum, in consequence of his father's attainer: he was one of the barons who extorted Magna Charta from John. In the subsequent war with the barons, the king came into this county: and it was in crossing the Wash from Lynn into Lincolnshire that he lost his baggage. The forces of Louis the Dauphin and his confederates afterwards overran this county. In the great rebellion of the Commons under Wat Tyler (A.D. 1381), the men of Norfolk took part under the command of John the Litester (or Dyer): but they were put down by the courage and activity of Henry Le Spencer, bishop of Norwich, who defeated them at North Walsham, and caused the Litester and the other leaders to be executed. At this time the manufacture of woollen stuffs was flourishing in the county; and Norwich was a large and populous city. The earldom of Norfolk had, before this, passed from the Bigod family to the Mowbrays. Thomas de Mowbray was created duke of Norfolk by Richard II. before A.D. 1380. He was banished by the king, A.D. 1398, and died at Venice two years afterwards. In the time of Edward IV., the direct male line of the Mowbrays having become extinct, the title of duke of Norfolk came to the duke of York, one of the young princes smothered in the tower by Richard III., who had married Lady Anne Mowbray, daughter of the last duke. Upon his death the dukedom was conferred by Richard on Sir John Howard, in whose family it has ever since remained. Henry VII., in order to assure himself of the loyalty of the people, visited Norfolk at the time of the imposture of Simnel: he kept his Christmas (1486?) at Norwich, and made a pilgrimage to the house of Our Lady of Walsingham.

Of the edifices of the middle ages, monastic, ecclesiastical, or castellated, Norfolk has several remains. The castle and cathedral of Norwich, the antient buildings of Lynn, and the abbey at Thetford, are noticed elsewhere. [LYNN; NORWICH; THETFORD.] Walsingham, Wymondham, and

Castle Acre, abbeys or priories, have been already described. Langley abbey is on the verge of the marshes of the valley of the Yare, 2 or 3 miles north of Loddon. It was founded A.D. 1198, by Robert Fitz-Roger Helke, or De Clavering, for Premonstratensian canons: its yearly revenues at the suppression were 128*l.* 19*s.* 9½*d.* gross, or 104*l.* 16*s.* 5*d.* clear. The abbey of St. Bennet of Hulme is in the marshes near the junction of the Bure with the Thurn and the Ant. The spot on which it was built had been granted by an East Anglian chieftain, about A.D. 800, to a society of religious Eremites, who built a chapel and other buildings here. This was destroyed by the Danes in the invasion under the sons of Lodbrog (A.D. 870). The chapel and houses were rebuilt about a century after: and King Canute founded and endowed, before A.D. 1020, a Benedictine monastery, whose yearly revenues at the dissolution were 677*l.* 9*s.* 8½*d.* gross, or 583*l.* 17*s.* 0½*d.* clear. At West Dereham, between Stoke Ferry and Downham market, an abbey for Premonstratensian canons was founded A.D. 1188, by Hubert, then dean of York: its yearly revenues at the dissolution were 252*l.* 12*s.* 11½*d.* gross, or 228*l.* 0*s.* 0½*d.* clear. The chapel and hospital (afterwards priory and abbey) of North Creak, 2 miles south of Burnham-market, were founded by Sir Robert de Nerford, A.D. 1206. The priory and abbey belonged to the regular canons of St. Austin: it did not continue till the dissolution. Of all these institutions there are ruins which contain some beautiful portions, chiefly in the early English style. The chief remain of that of St. Bennet of Hulme is the gate-house, over which a draining mill has been erected; and there are traces of walls enclosing an area of at least 35 acres. There are some remains of Beeston priory, founded for the canons of St. Austin, in the reign of John or of Henry III. They are near the sea, on the road between Cromer and Cley, about 3 miles from Cromer. The revenues of this priory at the dissolution were 50*l.* 6*s.* 4½*d.* gross, or 43*l.* 2*s.* 4½*d.* clear. There are a few remains of the once extensive priory of Fitcham, about 9 miles north-east of Lynn: they are used for or are incorporated in the barns, stables, or other offices of a farm-house. This priory was founded for Austin canons by Sir Robert Aguilon, in the reign of Henry III.; and had a yearly revenue at the dissolution of 62*l.* 10*s.* 6½*d.* gross, or 55*l.* 5*s.* 6½*d.* clear. Binham priory (5 miles south-east of Wells), founded by Peter de Valoines, nephew of William the Conqueror, for Benedictines, subordinate to the great abbey of St. Alban's, had at the dissolution a yearly revenue of 160*l.* 1*s.* 0*d.* gross, or 140*l.* 5*s.* 4*d.* clear. The ruins are very considerable and interesting, but are gradually mouldering away. The nave and north aisle, and a portion of the south aisle of the conventual church, with the chief part of the west front, and the ruins of the north transept, remain. The west front is of early English character, very fine: it had a beautiful large window, now blocked up with plaster. The interior of the church is of Norman architecture. The nave and north aisle are at present used as the parish church. Of Broomholm priory near the sea, between Cromer and Yarmouth, founded by William de Glanvill (A.D. 1113) for Cluniac monks, there are some remains incorporated into a farm-house, or converted into offices: revenue at the dissolution, 147*l.* 9*s.* 0½*d.* gross, or 100*l.* 5*s.* 3½*d.* clear.

Several of the churches near the valley of the Waveney and in other parts of the county have round towers of no great dimensions, surmounted by an octagonal upper story. The origin of these towers has furnished a subject for much antiquarian conjecture. Hadiscope church, in the valley of the Waveney, one of these, has a Norman doorway: Gillingham church, near Hadiscope and Framlingham Earl, are chiefly of Norman architecture; the former church has a tower rising from the centre; the east end of the church, which is semicircular, is covered with thatch. Hillington, Thwaite, and South Lopham churches have all portions of Norman architecture. Little Snoring church has a doorway exhibiting a curious mixture of Norman and early English character. Northwold church has in the chancel against the north wall a lofty shrine, the upper part of which is composed of canopies over niches, while the lower part forms an altar tomb, on which are three figures of armed men in a posture of alarm, designed to represent the soldiers at the resurrection of our Lord. This shrine was erected for the purpose of the ceremonies used on Good-Friday and Easter-day. At Houghton, near Walsingham, is a small antient chapel, which affords a beautiful specimen of architecture, chiefly of decorated English character.

The principal castles are those at Norwich, described elsewhere [NORWICH]; Castle Acre, and Castle Rising, described above, and Caister next Yarmouth. Caister is built of brick, and has been thought to be one of the oldest brick edifices in the kingdom. Others however ascribe its erection to Sir John Fastolfe, an officer who served with great distinction in the French wars of Henry V. and VI. It was twice besieged in the war of the Roses. An embattled tower at the north-west corner, one hundred feet high, and the north and west walls remain; but the south and east sides are levelled with the ground. There are the ruins of a castle at Weeding All Saints, near the Little Ouse, opposite Brandon. The gateway of Titherington-hall, commonly called Middleton Castle, at Middleton, 4 miles south-east of Lynn, is yet standing. It is of brick, and consists of a square tower with turrets at the four corners, rising considerably higher than the rest of the tower. It was probably erected by the Lord Scales, who distinguished himself in the French wars of Henry V. and VI.

There are several antient manor-houses or halls: Oxburgh Hall, near Stoke Ferry, on a stream that flows into the Wissey, was erected near the end of the fifteenth century by Sir Edmund Bedingfield. It is wholly constructed of brick, and originally enclosed a quadrangular court, 118 feet by 92. The entrance is over a bridge (formerly a drawbridge), and through a gateway between two fine towers 80 feet high. The floors and the roofs of some of the rooms are of fine brick, and the walls are in some parts covered with old tapestry. Part of the original building has been taken down, and the disposition of the other parts changed. The whole is surrounded by a moat 52 feet broad and 10 feet deep. Of East Basham House, near Fakenham, built in the reign of Henry VII. or Henry VIII., the walls of the porter's lodge and some of the apartments on the northern side of the court remain, and are appropriated as a farm-house. At Fincham, about 4 miles east of Downham-market, is an old house, now occupied as a farmhouse, which exhibits an early specimen of the revived Grecian style in domestic architecture. Winwal House, near Stoke Ferry, is perhaps the most antient domestic edifice in England. It has Norman buttresses, and some portion of ornament in that style. It consists of two stories, each containing two apartments; the whole building is only 33 feet long by 27 deep, and scarcely 16 feet high. Oxnead Hall, and Blickling Hall near Aylsham, belong to a later period—Oxnead to that of Elizabeth, Blickling to that of James I. or Charles I.

In the disturbances which arose out of the Reformation, Norfolk became the scene of tumult. A rising took place at Attleburgh (A.D. 1548), and it soon became serious. Ket, a tanner of Wymondham, was chosen leader of the rebels, who encamped on Mousehold heath, near Norwich, to the number of 20,000. Ket, with two assessors from each hundred in the county, held a court of justice under an oak, since called 'the oak of reformation,' and issued edicts levying contributions for the support of his followers. The marquis of Northampton, who commanded a force sent to watch the rebels till a more powerful army could be collected, having entered Norwich with 1100 men, was beaten out by them with the loss of 100 men. The rebels burnt part of the city, and returned in triumph to their camp on Mousehold. They were however at length attacked by the earl of Warwick with an army that had been collected to invade Scotland, and were totally defeated in a place called Duffen Dale, to which they had retired. Ket was hanged on Norwich castle, and his brother on the tower of Wymondham church; and the rebellion, which had also broken out in other parts of England, was put down.

In the struggle between Charles I. and the parliament this county zealously embraced the side of the latter, and was one of 'the associated counties' under the earl of Manchester. The king had little hold on the county at any time. Lynn, of which his troops had taken possession, was besieged and taken by the earl of Manchester.

(Blomefield's *History of Norfolk*; Donald and Milne's *Map of Norfolk*; Conybeare and Phillips's *Outlines of the Geology of England and Wales*; Greenough's *Geological Map of England*, Robberds's *Historical and Geological Observations on the Eastern Valleys of Norfolk*; Priestley's *History of Navigable Rivers and Canals*; Lewis's *Topographical Dictionary*; *Beauties of England and Wales*; *Parliamentary Returns and Papers*; Ives's *Enquiry concerning Gariannum*; Turner's *Anglo-Saxons, and Hist. of England in the Middle Ages*; Sir F. Palgrave's *Rise*

and Progress of the English Commonwealth, and History of England (Anglo-Saxon period), in the 'Family Library'; Rickman's *Gothic Architecture*; Britton's *Architectural Antiquities*.)

## STATISTICS.

**Population.**—Norfolk is partly an agricultural and partly a manufacturing county; it may be ranked mostly, among the whole of the counties, as the former, being the fifteenth on the list in 1831. According to the Population Returns of 1831, of 93,498 males twenty years of age and upwards only 4740 were then employed in manufactures or in making manufacturing machinery, while 45,413 were engaged in agricultural pursuits; 37,466 of the latter number were agricultural labourers. Of the 4740 men engaged in manufactures, 3752 were employed in the manufacture of bombazine in Norwich, 247 in Wymondham, and about 300 at Marsham, Hovingham, Haynford, Bunwell, and a few other places. About 100 men were employed in hempen and linen manufactures at North and South

Lopham and elsewhere; at Great Yarmouth, about 30 in winding and weaving silk, and as many perhaps in other places; a few men were employed in the various villages in the woollen manufacture, and about twenty in making agricultural machines.

The population of Norfolk at each of the four following periods, was—

	Males.	Females.	Total.	Increase per cent.
1801	129,842	143,529	273,371	..
1811	138,089	153,910	291,999	6·81
1821	166,892	177,476	344,368	17·93
1831	189,323	200,731	390,054	13·26

showing an increase between the first and last periods of 116,683, or more than 42½ per cent. on the whole population, being 14½ per cent. below the whole rate of increase throughout England.

The following table exhibits a summary of the population of every hundred, &c., as taken in 1831.

HUNDREDS, CITIES, or BOROUGHES.	HOUSES.				OCCUPATIONS.			PERSONS.			
	Inhabited.	Families.	Build- ing.	Unin- habited.	Families chiefly employed in Agri- culture.	Families chiefly employed in trade, manufac- tures, and handicraft.	All other Families not com- prised in the two preced- ing classes.	Males.	Females.	Total of Persons.	Males, twenty years of age.
Blofield (Hundred) .	889	1,055	3	20	669	246	140	2,644	2,646	5,290	1,296
Brothecross . . .	872	954	11	18	534	291	129	2,047	2,096	4,143	1,064
Clackclose . . .	3,288	3,621	15	94	2,269	887	465	8,809	8,854	17,663	4,415
Clavering . . .	1,057	1,288	4	8	896	274	118	3,294	3,317	6,611	1,656
Depwade . . .	1,732	2,068	11	31	1,295	499	274	5,028	5,003	10,031	2,522
Diss . . .	1,647	1,933	7	53	989	541	403	4,596	4,704	9,300	2,216
Earsham . . .	1,513	1,737	2	39	1,077	464	196	4,132	4,353	8,485	1,984
Erpingham, (North) .	2,018	2,164	24	80	1,143	485	536	5,057	5,103	10,160	2,444
Erpingham, (South) .	2,994	3,293	21	90	1,841	916	536	7,382	7,516	14,898	3,632
Eynsford . . .	1,841	2,351	7	40	1,440	564	347	5,524	5,433	10,957	2,769
Flegg, East . . .	625	662	2	18	422	194	116	1,508	1,490	2,998	721
Flegg, West . . .	685	835	2	11	530	142	163	2,120	2,092	4,212	1,020
Forehoe . . .	2,504	2,851	17	44	1,469	1,063	319	6,912	6,926	13,838	3,364
Freebridge, (Lynn) .	2,105	2,472	20	47	1,688	514	270	6,084	6,143	12,227	2,907
Freebridge, (Marsh- land) . . .	2,179	2,328	11	99	1,669	394	265	5,687	5,587	11,274	2,836
Gallow . . .	1,755	2,006	9	51	1,188	461	357	4,592	4,786	9,378	2,267
Greenhoe (North) . .	2,101	2,259	4	66	944	633	682	5,071	5,340	10,411	2,291
Greenhoe (South) . .	1,850	2,068	8	27	1,197	596	275	5,102	5,135	10,237	2,445
Grimshoe . . .	1,252	1,349	7	37	897	273	179	3,268	3,112	6,380	1,672
Guilt Cross . . .	1,009	1,395	6	26	813	223	159	3,399	3,362	6,761	1,671
Happing . . .	1,195	1,413	2	18	944	257	212	3,200	3,246	6,446	1,664
Henstead . . .	1,070	1,167	23	23	764	289	114	2,757	2,653	5,410	1,399
Holt . . .	2,102	2,289	26	54	1,164	584	541	5,122	5,294	10,416	2,593
Humbleyard . . .	921	1,110	10	16	807	210	93	2,675	2,734	5,409	1,353
Launditch . . .	2,235	2,678	23	51	1,825	571	282	6,474	6,165	12,639	3,212
Loddon . . .	1,316	1,502	9	29	910	386	206	3,762	3,695	7,457	1,845
Mitford . . .	2,229	2,366	23	77	1,260	792	314	5,712	5,783	11,495	2,737
Shropham . . .	1,493	1,760	9	32	1,184	394	182	4,311	4,255	8,566	2,136
Smithdon . . .	1,494	1,781	4	58	1,165	386	230	4,122	4,140	8,262	2,082
Tavesham . . .	1,428	1,582	2	85	997	412	173	3,811	3,884	7,695	1,889
Tunstead . . .	2,158	2,347	7	71	1,347	570	430	5,173	5,420	10,593	2,516
Walsham . . .	773	934	5	5	633	222	79	2,287	2,238	4,525	1,195
Wayland . . .	1,333	1,422	3	16	1,000	334	88	3,363	3,461	6,824	1,666
King's Lynn (Borough)	2,707	3,035	27	180	24	1,736	1,275	5,972	7,398	13,370	2,846
Norwich (City) . . .	13,156	14,572	67	1,050	509	9,174	4,889	27,761	33,355	61,116	14,249
Thetford (Borough) .	675	716	12	13	81	467	168	1,585	1,877	3,462	820
Yarmouth, Great (Bo- rough) . . .	4,570	4,869	23	191	26	2,297	2,546	8,980	12,135	21,115	4,105
Totals . . .	74,793	84,232	439	2,868	37,610	28,871	17,751	189,323	200,731	390,054	93,498

**County Expenses, Crime, &c.**—The sums expended for the relief of the poor at the four dates of—

	£.	s.	d.
1801 were	169,733	being	12 5 for each inhabitant.
1811 . . .	291,501	"	19 11 "
1821 . . .	256,044	"	14 10 "
1831 . . .	299,357	"	15 4 "

The sum expended for the same purpose for the year ending March, 1838, was 167,844.; and assuming that the population had increased from 1831 to 1838 at the same rate of progress as in the ten preceding years, the above sum gives

an average of 7s. 10½d. for each inhabitant. These averages are above those for the whole of England and Wales.

The sum raised in this county for poor-rate, county-rate, and other local purposes, in the year ending 25th March, 1838, was 358,006½., and was levied upon the various descriptions of property as follows:—

On land . . .	£281,879 0s.
Dwelling-houses . . .	63,041 13
Mills, factories, &c. . .	8,842 19
Manorial profits, navigations, &c. . .	4,242 10

Total £358,006 2

The amount expended was—

For the relief of the poor	£316,654 16s.
In suits of law, removal of paupers, &c.	8,841 7
For other purposes	32,125 17

Total money expended £357,622 0

In the Returns made up for the subsequent years the descriptions of property assessed are not specified. In the years 1834, 1835, 1836, 1837, and 1838, there were raised 355,684*l.* 18*s.*, 327,050*l.*, 275,951*l.* 18*s.*, not given for 1837, and 191,226*l.* respectively; and the expenditure of each year was as follows:—

	1834.	1835.	1836.	1837.	1838.
For the relief of the poor	306,787	273,425	230,762	177,538	167,748
In suits of law, removal of paupers, &c.	9,535	8,084	6,697	2,613	1,637
Payments towards the county-rate	36,565	16,469	16,430	not given	18,199
For all other purposes		29,322	25,844	16,845	17,921
Total money expended	£351,937	327,300	279,733		205,541

The saving effected in the sum expended for the relief of the poor in 1838, as compared with that expended in 1834, was therefore 139,003*l.* 9*s.*, or more than 45 per cent.; and the whole sum expended was less in 1838 than it was in 1834 by 146,346*l.*, or more than 41 per cent.

The number of turnpike trusts in Norfolk, as ascertained in 1836, were 15; the number of miles of road under their charge was 271. The annual income arising from tolls and parish composition in lieu of statute duty in 1836 was 16,016*l.* 18*s.*, and the annual expenditure in the same year was as follows:—

	£.	s.	d.
Manual labour	3,087	3	0
Team labour and carriage of materials	1,036	13	0
Materials for surface repairs	2,598	9	0
Land purchased	130	12	0
Damages done in obtaining materials	144	8	0
Tradesmen's bills	824	0	0
Salaries of treasurer, clerk, and surveyor	1,122	8	0
Law charges	194	13	0
Interest of debt	2,958	5	0
Improvements	1,546	11	0
Debts paid off	543	6	0
Incidental expenses	392	7	0
Estimated value of statute duty performed	1,242	6	0
Total expenditure	£15,821	1	0

The county expenditure in 1834, exclusive of that for the relief of the poor, was 15,875*l.* 13*s.*, disbursed as follows:—

	£.	s.	d.
Bridges, building, repairs, &c.	739	5	0
Gaols, houses of correction, &c., and maintaining prisoners, &c.	7,356	13	0
Shire-halls and courts of justice, building, repairing, &c.	114	5	0
Lunatic Asylums	296	3	0
Prosecutions	3,731	16	0
Clerk of the peace	742	15	0
Conveyance of prisoners before trial	1,048	14	0
Conveyance of transports	405	15	0
Vagrants, apprehending and conveying	54	19	0
Constables, high and special	31	5	0
Coroner	329	16	0
Miscellaneous	1,024	6	0
Total expenditure	£15,875	13	0

The number of persons charged with criminal offences in the three septennial periods ending with 1820, 1827, and 1834, were 1871, 2829, and 3650 respectively, making an average of 267 annually in the first period, of 404 in the second period, and of 521 in the third period. The number of persons tried at quarter-sessions in each of the years 1831, 1832, and 1833, in respect to which any costs were paid out of the county rates, were 362, 283, and 279 respectively. Among the persons charged with offences there were committed for—

	1831.	1832.	1833.
Felonies	282	218	238
Misdemeanors	80	65	41

P. C., No. 1011.

The total number of committals in each of the same years was 337, 264, and 289 respectively.

	1831.	1832.	1833.
The number convicted was	229	189	205
The number acquitted was	78	34	47
Discharged by proclamation	30	41	37

There were 588 persons charged, in 1838, with crimes at the assizes and sessions in Norfolk. Of these 31 were charged with offences against the person, 11 of which were common assaults; 33 were charged with offences against property committed with violence; 495 with offences against property committed without violence; only 3 were charged with malicious offences; 6 for forging and uttering base coin, and 20 for various misdemeanors. Of the whole number committed 412 were convicted, 117 were acquitted, 11 were not prosecuted, and no bill was found against 46. Of those convicted one was sentenced to death, but not executed, his sentence was commuted into transportation for life; 36 were sentenced to transportation for various periods; 7 to imprisonment for 2 years, 41 for 1 year, and 288 for 6 months or under; 10 were fined, and 1 was found insane. Of the whole number of offenders, 515 were males and 73 females; 225 could neither read nor write, 270 could read and write imperfectly, 82 could read and write well, 4 had superior instruction, and the degree of instruction could not be ascertained of the remaining 7.

The number of persons registered, in 1837, to vote for county members was 15,601. Of these, 9496 were freeholders, 39 leaseholders, 1824 copyholders, 3474 occupying tenants, 210 annuitants, and 1558 whose tenures were part freehold and part copyhold; being 1 in 25 of the whole population, and 1 in 6 of the male population 20 years of age and upwards, as taken in 1831.

Norfolk contains 9 savings' banks; the number of depositors and amount of deposits, on the 20th of November in each of the following years, were as under:—

	1832.	1833.	1834.	1835.
Number of depositors	6959	7683	8473	8953
Amount of deposits	£212,809	£233,265	£250,423	£269,465

The various sums placed in the savings' banks in 1836, 1837, and 1838, were distributed as under:—

	1836.		1837.		1838.	
	Depositors.	Deposits.	Depositors.	Deposits.	Depositors.	Deposits.
Not exceeding £20	5,387	£38,334	5,857	£42,094	6,630	£46,049
" 50	2,711	84,070	3,037	93,570	3,377	103,985
" 100	1,225	83,590	1,316	90,035	1,378	95,273
" 150	393	47,070	382	45,905	454	54,220
" 200	214	37,287	237	40,931	257	44,317
Above 200	17	3,598	19	3,911	22	4,630
	9,947	293,949	10,847	316,406	12,118	349,500

*Education.*—The following summary is taken from the Parliamentary Returns on Education made in the session of 1835:—

	Schools.	Scholars.	Total.
Infant schools	133		
Number of children at such schools; ages from 2 to 7 years:—			
Males		800	
Females		782	
Sex not specified		1,169	
			2,751
Daily schools	1,091		
Number of children at such schools; ages from 4 to 14 years:—			
Males		13,342	
Females		11,783	
Sex not specified		7,252	
			32,377
Schools	1,224		
Total of children under daily instruction			35,128
Sunday-schools	502		
Number of children at such schools; ages from 4 to 15 years:—			
Males		11,568	
Females		12,575	
Sex not specified		6,277	
			30,420

Assuming that the population between the ages of 2 and 15 years has increased in the same proportion as the whole of the population since 1821, and that the whole population has increased in the same ratio since 1831 as in the



years preceding that time, the approximate number of children between the ages of 2 and 15 thus found residing in Norfolk, in 1833, was about 130,798.

Fifty Sunday-schools are returned from places where no other school exists, and the children who are instructed therein (1994 in number) cannot be supposed to attend any other school; at all other places Sunday-school children have opportunity of resorting to other schools also, but in what number, or in what proportion duplicate entry of the same children is thus produced, must remain uncertain.

Sixty-eight schools (containing 3737 children), which are both daily and Sunday schools, are returned from various places, and duplicate entry is therefore known to have been thus far created. In some of the Sunday-schools, some persons as old as 50 years are in attendance. Making allowance for these two causes therefore, we may perhaps fairly estimate that little more than one-third of the children between the ages of 2 and 15 years are under instruction in this county.

### Maintenance of Schools.

Description of Schools.	By endowment.		By subscription.		By payments from scholars.		Subsidiary and payment from scholars.	
	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.
Infant Schools	—	—	6	176	115	1,787	12	788
Daily Schools	88	2683	113	4,340	768	18,787	122	6567
Sunday Schools	12	677	448	27,124	9	103	40	2516
Total...	100	3360	567	31,640	885	20,677	174	9871

The schools established by dissenters, included in the above statement, are—

Daily-schools	.	.	18, containing	Scholars.
Sunday-schools	.	.	123	10,960

The schools established since 1818 are—

Infant and other daily schools	535, containing	17,259
Sunday-schools	291	21,963

Thirty-two boarding-schools are included in the number of daily-schools given above. No school in this county appears to be confined to the children of parents of the Established Church, or of any other religious denomination, such exclusion being disclaimed in almost every instance, especially in schools established by dissenters, with whom are here included Wesleyan Methodists, together with Roman Catholics.

Lending libraries of books are attached to 45 schools in this county.

NORFOLK ISLAND is situated in the Pacific Ocean, between 29° and 29° 10' S. lat. and 168° and 168° 5' E. long., about 900 miles from Port Jackson in Australia. It is about six miles long from north-west to south-east, and nearly four in breadth. It rises from the sea with steep cliffs to a height of from 200 to 300 feet. These cliffs consist of a hard firm clay, of a very fine texture, and there are only a few paths by which the summit can be attained. Beyond the cliffs the island extends in an uneven plain, cut in many places by deep ravines. At the north-western extremity is a high hill, called Mount Pitt, which attains an elevation of about 1200 feet above the sea. The whole island is covered with a thick forest of heavy timber-trees. Many of the pine-trees are from 180 to 220 feet high, and from 4 to 8 feet in diameter at some distance from the ground. Among these is the araucaria. [ARAUCHARIA.] As the soil of the island is very fertile, a British settlement was formed in 1789, from Sydney in Australia; but although the grain sown produced abundant crops, and potatoes and other vegetables succeeded, and although the climate was very favourable to the health of the settlers, and the water good, it was abandoned some years afterwards on account of the difficulty of landing. The sea surrounding the island has a rocky bottom, and there is no good anchorage. A number of large rocks also lie scattered about close to the shore, on which a continual surf breaks with great violence. There are only three places at which boats can effect a landing, and at these only with certain winds, and never in gales, which are rather frequent. Sometimes no landing can be effected for weeks together, and vessels, being obliged to stand off, are in danger of being lost on the numerous reefs. Norfolk Island has lately been made a penal colony for convicts from New South Wales; and it now seems to be the intention of government to try there the experiment of an improved and beneficent system of convict discipline, which, while carrying out the punishment inflicted by the law, shall lead to reformation of

the criminals. (Hunter's *Historical Journal of the Transactions at Port Jackson and Norfolk Island*, London, 1793.)

### NORFOLK. [VIRGINIA.]

NORICUM, a province of the Roman empire, was bounded on the north by the Danube, on the west by Vindelicia and Rhætia, on the east by Pannonia, and on the south by Illyricum and Gallia Cisalpina. It was separated from Vindelicia by the Œnus (Inn), and from Gallia Cisalpina by the Alpes Carnicæ or Juliæ; but it is difficult to determine the boundaries between Noricum and Pannonia, as they differed at various times. Under the later times of the Roman empire, Mount Cæsius and part of the river Murus (Mur) appear to have formed the boundaries. Noricum would thus correspond to the modern Styria, Carinthia, and Salzburg, and to part of Austria and Bavaria. A geographer who wrote in the reign of Constantius, the son of Constantine the Great, includes Germania, Rhætia, and the Ager Noricus in one province. (Bode's *Mythographi Vaticani*, vol. ii.) Noricum is not mentioned by name in the division of the Roman empire made by Augustus, but it may be included among the Eparchies of the Cæsar. (Strabo, p. 840.)

Noricum was divided into two nearly equal parts by a branch of the Alps, which was called the Alpes Noricæ. These mountains appear to have been inhabited from the earliest times by various tribes of Celtic origin, of whom the most celebrated were the Norici (whence the country obtained its name), a remnant of the Taurisci. Noricum was conquered by Augustus, but it is uncertain whether he reduced it into the form of a province. It appears to have been a province in the time of Claudius, who founded the colony Sabaria, which was afterwards included in Pannonia. (Plin., iii. 27.) It was under the government of a procurator. (Tac., *Hist.*, i. 11.) From the 'Notitia Imperii' we learn that Noricum was subsequently divided into two provinces, Noricum Ripense and Noricum Mediterraneum, which were separated from each other by the Alpes Noricæ. In the former of these a strong military force was always stationed, under the command of a dux.

In addition to the Norici, Noricum was inhabited in the west by the Sevæces, Alauni, and Ambisontii, and in the east by the Ambidravi or Ambidrani; but of these tribes we know scarcely anything except the names. Of the towns of Noricum the best known was Noreia, the capital of the Taurisci or Norici, which was besieged in the time of Cæsar by the powerful nation of the Boii. (Cæsar, *Bell. Gall.*, i. 5.) It was subsequently destroyed by the Romans. (Plin., *Hist. Nat.*, iii. 23.) The only other towns worthy of mention were, Juvanum (Salzburg), in the western part of the province, Boiodurum (Innsbruck), at the junction of the Inn and Danube, and Ovilava, or Ovilaba, or Ovilava (Wels) south-east of Boiodurum, a Roman colony founded by Marcus Aurelius.

The iron of Noricum was in much request among the Romans (Pliny, *Hist. Nat.*, xxxiv. 41); and according to Polybius gold was formerly found in this province in great abundance (quoted by Strabo, iv., p. 208).

NORMA, the Rule, a constellation of Lacaille, situated between Scorpio and Lupus. Its principal stars are as follows—

Character.	No. in Catalogue of		Magnitude.
	(Plazid. Lacaille, C.)	Astron. Society.	
α	92	1889	5
δ	242	1831	5
γ <sup>a</sup>	1351	1862	5

NORMAL. This word (from *norma*) is generally used to mean a perpendicular drawn to the tangent line of a curve or the tangent plane of a surface. It formerly meant simply perpendicular. [TANGENT.]

NORMAN ARCHITECTURE. Some remarks upon this style have already been made in the article GOTHIC ARCHITECTURE, where it is spoken of as one of the local modifications of that generic style comprehended under the terms Romanesque, Lombardic, and even Byzantine, and of which the distinctive and characteristic feature is the

round-headed (rund-bogen styl) or semicircular arch. Being imported into this country immediately from Normandy at the time of the Conquest, it has obtained among us the epithet which it bears, and our examples of it are frequently further distinguished by that of *Anglo-Norman*. Between this and the earlier Anglo-Saxon some have endeavoured to draw a line, yet it is little more than an imaginary one, it being exceedingly doubtful whether any specimens of the latter are extant. Those examples which were assumed to be Anglo-Saxon are now admitted to be Norman; or if a doubt in favour of their genuineness remains, they merely prove that, instead of being a distinct style, the Anglo-Saxon itself was no more than an imitation of the mode of building then prevalent on the Continent—an offshoot of the same parent stock; for the distinctions endeavoured to be established between what has been called Anglo-Saxon and Anglo-Norman are not those of *style*, taking the term in its most comprehensive meaning, but of *mole of treatment*; the rudiments of both being alike, not only as regards the form of the arch, but nearly all other particulars, as far as buildings of one and the other class—supposing them to be distinct ones—have features in common: the differences are local and accidental; the architectonic principles and the taste as to a predilection for certain forms and details are the same.

The Anglo-Norman period of our architecture may be said to extend from the date of the Conquest to nearly the end of the following century, that is, to the close of the reign of Henry II., 1189; but there are very few buildings in this style throughout, though there are many which retain detached parts and features belonging to and some which mainly consist of it, more or less intermixed however with what is of later date and in different style. Besides which, some of the structures which may safely be received as genuine Norman, as far as mere dates go, furnish very little information as to the style itself, beyond what may be equally well or better ascertained from other specimens: they are so plain in themselves, and the few features which they do exhibit have so little remarkable in them, that what is chiefly to be learnt from such examples relates only to the mode of building employed, apart from architectural style, except as far as massiveness of construction and the absence of what constitutes design contribute towards character. Such is the case with respect to one entire class of buildings, namely, the castles of the Anglo-Norman period, which, however interesting they may be in other respects, offer comparatively little for study to the architect, as they seldom present to the eye more than enormous masses of masonry, where grandeur is produced by bulk alone, without deriving anything from the efforts of art.

A great deal of Norman work is to be met with in the older parts of several of our cathedrals, and also in many smaller churches, such as Barfreston in Kent; New Shoreham, Sussex; Iffley, Oxfordshire; Steely, Derbyshire, &c., which, having remained comparatively untouched, exhibit, although upon a limited scale, more of the Norman style and the peculiar mode of applying it than many larger edifices, notwithstanding that these latter occasionally present decorative features in this style which do not occur in buildings of a less pretending character. The older parts of Canterbury, Winchester, Gloucester, Ely, Durham, Norwich, Lincoln, and Oxford cathedrals are in this style. The nave and choir of Norwich in particular (founded in 1096), with the exception of pointed windows of later English character inserted in the upper part of the choir, are almost entirely Norman, of which they present a very fine example. Both that and the older portions of Gloucester are referred to by Hope as specimens of the Lombard style in England. It must be confessed however, that, putting aside the mere form of the arch and a few other individual parts, there is quite as much dissimilarity as resemblance between the Lombardic or round-arch style of Italy and that of this country. The combinations are almost altogether different. In England we have no instance of the low gable extending over a whole front, nor of sloping arcades beneath it [Lombardic Architecture, *cut*, p. 100], nor of tiers of small external galleries, nor of large circular windows as a principal feature in a façade, and still less of anything at all analogous to cupolas. Neither have we any examples of projecting doorways and porches resting upon richly sculptured columns, nor of ornamented pilaster-like shafts similar to that shown in the *cut* just referred to. Indeed we have very little remaining to show us the style of exterior composition

employed by our Anglo-Norman architects in their larger edifices. The west fronts of Rochester and Lincoln cathedrals are almost the only parts that can be considered as specimens of Anglo-Norman architecture; yet each of them has many interpolations of other styles. The lower part of the former is entirely Norman, and has a remarkably fine though not very spacious centre doorway; but the large window over that entrance, in the later Gothic or perpendicular style, is so very prominent a feature, as greatly to take away from the effect that would else be produced by the other parts. The front of Lincoln presents little more than a surface decorated by small columns and arches, as is shown in the *cut*, p. 318, Gothic Architecture. The general form, whose horizontal outline is broken only by a small gable of later date, is heavy, nor is there anything in common between this façade and those of the Lombardic churches. Wherever a superior degree of decoration was aimed at, the Anglo-Norman builders seem to have contented themselves with covering what would else have been blank surfaces with tiers of columns and arches of the kind referred to. The two transept towers of Exeter Cathedral, the front of Castle-Acre Priory, and of St. Botolph's Priory, Colchester, present little more; consequently, notwithstanding the variety as to detail, there is, as was also the case with Grecian architecture, a very great sameness as to general composition and design.

In the interiors of buildings this style exhibits itself more decidedly, owing not only to the perspective effect of a succession of spacious open arches, as in the naves of Norwich, Rochester, Chichester, Ely, and Peterborough cathedrals, but also to greater size and massiveness. Although such difference of character may at first appear somewhat incongruous, it being usual to find more minute and delicate forms employed for the internal parts of a building, the reason for it is evident; the tiers of pillars and arches on the exterior of Norman structures are merely decorations of the surface, while the arches and piers within are essential parts of the fabric. Instead of anything like lightness, we here meet with extraordinary massiveness, and sometimes uncouthness of proportions, arising from the excessive bulk of the piers from which arches spring: which character exhibits itself most strikingly when, as is the case with some of those in the nave of Norwich cathedral, the piers are merely short cylinders, with a kind of plain capital, and are not formed by shafts attached to a central mass of masonry. In the building just mentioned some piers of that description are ornamented on their surface by spiral grooves or flutings; and we may here remark that in that and other examples both cylindrical and clustered piers occur, not only in the same building, but in the very same part of it; and that great variety of detail and ornament is frequently observed in the mouldings of arches, columns or piers and their capitals, though they are uniform as to size, and compose a single range. Owing to the great diameter required for the supports of larger arches below, the mere pillar-shape was never employed for them, for although pillars of slender proportions were introduced for such purpose, it was only as *pier shafts*, or when the entire pier was made to consist apparently of a cluster of slender pillars, as some of those in the nave at Durham. It is true that slender detached pillars are of frequent occurrence, but then it is only to support small arches, as where a window is divided into or composed of two or more such arches, or in the triforia and other galleries within the building, where openings corresponding with the larger arches below are divided after the same fashion, and therefore do not form a continued arcade, but coupled or tripled arches at intervals, between the main piers. Sometimes the larger arches below, instead of being connected and resting upon the general capital of the pier, spring from *nook-shafts* or slender attached pillars, within the re-entering angles of the pier itself, the face of which was either left as a plain space dividing those pillars and the arches from the adjoining ones, or else decorated with another shaft carried quite up to the springing of the vault, and therefore very appropriately distinguished by Whewell by the term *vaulting-shafts*. Of the latter mode, the nave of the Abbaye aux Dames at Caen presents an example; while the Abbaye aux Hommes at the same place and the nave of Chichester give a combination of both; for there the loftier shaft does not fill up the space between the archivolts of the arches at their springings. But although attached pillars and shafts were almost uniformly of exceedingly tall and slender proportions, we occasionally meet with pillars short



and stumpy and with bulky capitals, although the arches are very narrow, and the pillars themselves in situations where more delicate forms would have been sufficient. Of single columns approaching to the proportions of antient Roman columns, like those which are found in the Lombardic buildings of Italy, our Anglo-Norman structures afford scarcely an example, except it be in that part of Canterbury cathedral called Becket's Crown, where columns partaking very much of the Corinthian character, though somewhat bolder and more masculine, are employed as piers to support the arches (not round-head, but pointed); or they are rather coupled columns united back to back. Within crypts very short detached single columns were employed to support the arches of the vaulting, but this deviation from the usual practice would seem to have been occasioned merely by the local peculiarities of such subterraneous apartments, and consequently it can hardly be considered as characteristic of the style itself.

Having spoken of the style generally, we shall now briefly describe its principal component parts and separate features, which are not very numerous in themselves, although it would occupy some space and require a great number of explanatory cuts, if we were to attempt to notice the varieties of them, because few as are the general forms, and unvaried as is the general character, the diversity of detail and minutiae is exceedingly great.

*Doorways*, even in small and otherwise plain buildings, and even when small in themselves, seem always to have had a great deal of embellishment bestowed upon them; and many have therefore been preserved in buildings, in every other part of which nearly all traces of the original Norman edifices have been obliterated by subsequent alterations. In many instances doorways are very deeply recessed, and in proportion to the aperture or door itself the dressings or decorations occupy a great space. This is likewise the case in the Gothic or pointed style; and it not only allowed great latitude in other respects, but enabled the architect to make what would else have been an insignificant feature, an important one in the design. A cut of the doorway at Romsey abbey is given at page 321 of *GOthic ARCHITECTURE*, and we here introduce another specimen from Barfreston church, Kent, which, although small, is in some respects not only



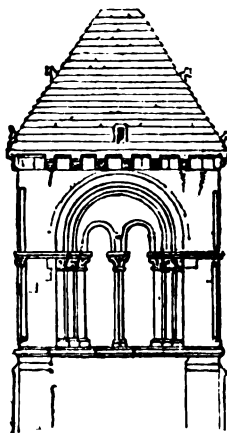
of a different but of a richer and more elegant character, and will serve as an example of a square-headed door, where the arched space above it is filled up with sculpture. In this example the archivolt mouldings extend on each side considerably beyond the general recess of the doorway; which was frequently but by no means invariably the case. The *chevron*, or zigzag moulding, was a very favourite ornament with the Normans, both for archivolts and other decorative mouldings; but that there were great varieties of such mouldings will appear from the following specimens.



Few as these examples are, they will convey some idea of the delicacy and even elegance of the ornamental detail employed in this style.

*Windows* had scarcely ever much decoration; they were generally small and placed at a considerable distance from each other; sometimes, too, merely plain apertures in the wall, and rarely more than scantily ornamented. At p. 201, *GOthic ARCHITECTURE*, are two specimens of Norman windows, one consisting of a single opening, the other divided by a central pillar. In regard to such feature, the Norman and Gothic styles differ essentially, quite as much as if not more than they do in the mere form of their respective arches; for besides that windows are very secondary features in the one style, whereas they are among the principal and most characteristic features in the other, Norman windows have neither mullions nor transoms, nor any tracery or open compartments in head of the arch; for even where the aperture is divided into two smaller arches, resting upon a central pillar, the space or head between those arches and the larger one which includes them is never perforated or otherwise decorated. Hence the windows themselves were necessarily limited as to size: not but that it would have been very possible to increase the number of openings by means of additional pillars, and by afterwards perforating the general head of the window above the smaller arched divisions, although not with equal consistency as in Gothic architecture, where the mouldings of the mullions are continued upwards and form the ribs of the tracery, however complicate it may be. Sufficient hints for such purpose might have been found in some of the intersecting patterns of ornament which occur among the exterior enrichments of Norman buildings.

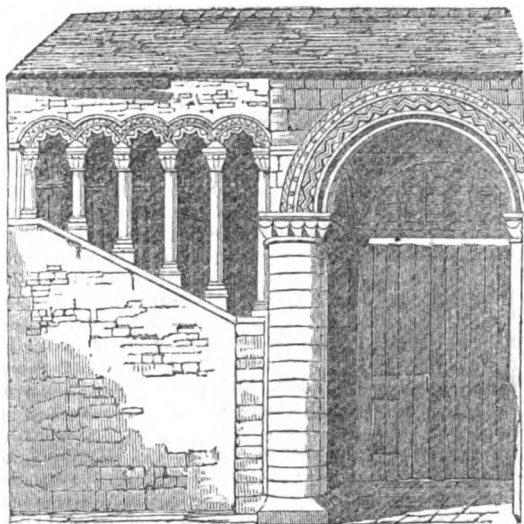
By way of showing how windows were occasionally made more important external features than usual, we subjoin a sketch of one in the upper part of the tower of Than Church in Normandy, where, although the apertures themselves



are narrow, the external breadth is rendered very considerable by means of the numerous pillars, or nook-shafts, on each side. Handsome in its general character, such form

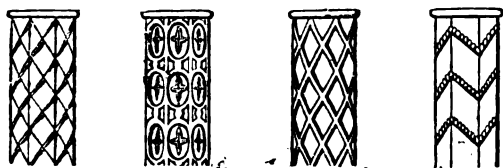
of window would admit of almost any degree of enrichment, by the mouldings being carved. In the story beneath it is a narrower window, with openings not half the breadth of the others, yet very nearly of the same height, and in other respects very different; but for that we must refer to the original plate, in Pugin's 'Architectural Antiquities of Normandy,' which comprises also a very interesting section of the whole tower. We may however call attention to the steep pyramidal stone roof, which form is supposed to have afterwards led to that of the spire, in like manner as its ornaments of animals' heads and figures may have suggested the first idea of crockets. Both triple windows, and window-like openings in internal galleries, divided by two pillars into three arches, of which the middle one is wider and loftier than the others, also occur. There are also windows in this style which, though narrow, are of very considerable dimensions as to height, like those at the east end of Canterbury Cathedral.

As a very peculiar and interesting specimen of Anglo-Norman architecture, and for the purpose of showing how, by increasing the number of openings and pillars, windows might have been extended in this style, we here exhibit a sketch of an external staircase leading to the registry at Canterbury.



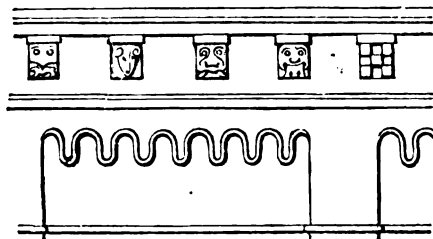
In this example there is somewhat to remind us of the open galleries of the Italian Lombardie, especially of those upon sloping lines beneath pediments [LOMBARDIC ARCHITECTURE, *cut*, p. 100], with this difference, that here the arches form a horizontal line. We have here also an instance of what was by no means uncommon in small arches in this style when they are not pierced through, which is, that the inner margin of the arches is formed by a chevron moulding which scallops them.

*Buttresses*, to which buildings in the Gothic style are indebted for so much of their character and effect, can hardly be said to exist in either Norman or Lombardic architecture. The enormous thickness of the walls and their solidity, owing to the smallness and infrequency of apertures in them, rendered such additional support unnecessary,



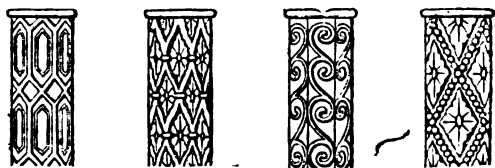
With respect to capitals, the diversity is so great as to render it impossible, at least here, to attempt to classify them, or particularise even the leading varieties: while some are both rude and plain, others are remarkable for the delicacy of workmanship and the taste shown in their enrichments: some, though they do not lack ornament, are either too poor and insignificant, while others again, though quite plain, have something pleasing in their mass and contour, and in the proportion they bear to the height of the shafts. Of the plainer sort of capitals, the most common

even where the vaulting of the roof was large and bold. Hence nothing more than either *buttresses*, or *pilaster strips* (as they are conveniently termed by Mr. Whewell), were introduced, and these more for the sake of producing some variety and degree of expression than for actual strength, their projection beyond the general plane of the wall being very inconsiderable, and no more in fact than that of the corbelled parapet, or *corbel-table*; consequently buttress-strips do not so properly constitute projecting surfaces, as the intermediate spaces of wall form recessed compartments, or large pannels. The parapet itself was seldom more than a plain corbel-table, without battlement, except in castellated buildings; but sometimes, instead of forming a horizontal line, the lower edge of the corbel was what might be described as *embattled-reversed*, that is, indented like a range of battlements hanging downwards, or else made *wavy*, or scalloped with curves.

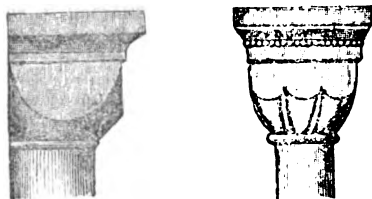


But the more common mode was to make the lower edge of the corbel table straight, with a series of corbel mouldings beneath it, frequently intersected by small blocks at intervals (after the manner of modillions), which were either left plain or sculptured with grotesque heads and figures. Occasionally again the corbelling assumed the form of a series of small interlacing arches, of which kind of decoration instances frequently occur in the Italian Lombardic.

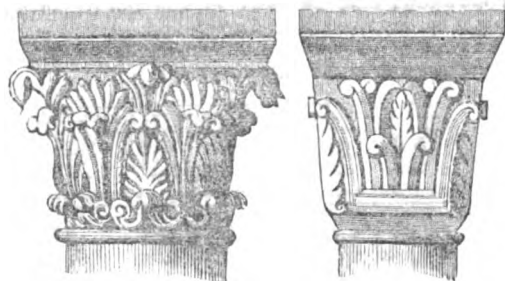
*Pillars* and *Columns*, with which the massive circular arch-piers, or piers with nook-shafts, are not to be confounded, exhibit great diversity of character, both as to proportions and decoration, from the rudest and plainest forms to either the lightest or the most enriched. Neither are the two terms to be regarded as precisely synonymous, it being as well to observe the distinction made between them by Whewell, and to restrict the latter term, which is also termed the *nebule* moulding, to such pillars as approach to the general proportions and character of classic columns, as is the case with those already mentioned as being in Becket's Crown, Canterbury. *Pillars*, on the contrary, have very great variety of proportions, either much below or greatly above such standard. The shafts are for the most part plain, though instances occur of their being carved (as was oftener than not the case with the columns of Lombardic porches); and in the undercroft at Canterbury Cathedral there are pillars whose shafts are fluted spirally. Raised mouldings, intersecting each other spirally so as to form a diamond-pattern on the surface, are by no means unfrequent; and some of the circular arch-piers in Durham cathedral are so ornamented: zigzag or chevron lines were also employed for decorating the surfaces of piers and columns, and were disposed either annularly, in horizontal rings, or spirally. Of these and some other varieties specimens are here shown.



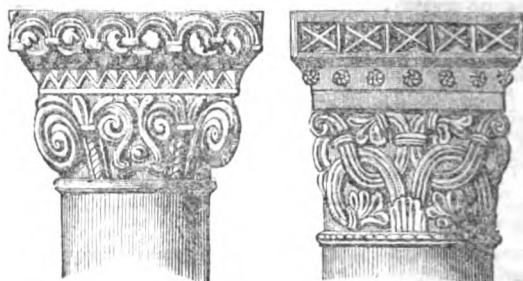
shape of those occurring in Anglo-Norman buildings is what Mr. Whewell designates the *Cushion Capital*, and which is formed by an inverted cone, of convex contour, spreading up towards the abacus, but intersected by four planes, producing as many flat surfaces or sides, answering to those of the abacus. This will be rendered more intelligible by the annexed examples from Rochester Cathedral, although they instance varieties of the cushion capital, the stem or circular part of each being cleft, whereby the planes or faces for the sides become scalloped.



Of the variety of sculptured and enriched capitals, the four specimens here annexed do not go far towards



conveying an adequate idea, nor are they the very best that are to be met with; nevertheless they may suffice. The first two are foreign, namely, from Jumieges and Sanson sur Rille; the others from St. Peter's, Northampton, and Steetly church, Derbyshire. The last of these is as remarkable for the Grecian character of the intertwining volutes carved upon it, as the first is for its striking general resemblance to the Corinthian capital. The one from Northampton has the least to recommend it, being a very uncouth composition. Besides those in our own cathedrals, a few other examples of sculptured capitals, more curious however than valuable as studies on account of the taste which they display, will be found



in Pugin's work already referred to; but there has been comparatively very little published to elucidate architecturally the subject of the Norman style.

*Pier-Arches*, that is, open arches resting upon piers, as those within churches, do not materially differ in design from those which ornament doorways, except that they are not so profusely decorated, and the archivolt mouldings do not occupy by any means so much space in proportion to the width of the opening. The arches themselves being uniformly circular (though in some few cases either somewhat more than a semicircle or prolonged perpendicularly to the impost), exhibit so far no variety; still, as regards the entire aperture, of which the arch itself forms the head, there is very great variety of character, according to the proportion which the heights of the supporting piers bear to the diameter of the arch, or opening between them. About twice the breadth appears to have been the average height of arches (*i.e.* openings) between piers; when much above that standard they may be called lofty (as the arches of the nave at Durham); and when much beneath it, they may be considered of low proportions. Besides the difference of character thus occasioned, much is also produced both by the form and proportions of the piers themselves. A circular or octagonal pier, for instance, appears much more massive than one composed of clustered shafts, &c., though the general diameter of the latter may be the same, or even somewhat more. Though we cannot pursue this point any further, we would recommend those who feel at all interested in the subject to make such comparisons for themselves; and they will doubtless find that they will be led on to make many others, and to enter into original investigations.

As the best way perhaps of impressing on the memory the leading characteristics of Norman architecture, we shall here briefly contrast them with those of the Gothic style.

NORMAN.	GOthic.
Round headed arch.	Pointed arch, varying in proportions.
No tracery in windows.	Windows with mullions, transoms, and tracery.
Buttress-strips.	Buttresses rising in offsets or stages.
No pinnacles.	Pinnacles.
Battlements, doubtful if any.	Battlements in the ecclesiastical as well as military style.
Spire scarcely known.	Spire characteristic features.
Spliced surfaces of rare occurrence.	Splices for receding parts, universal.
Niches ditto.	Niches very general.
Windows generally small and few.	Windows spacious and numerous.
Horizontal lines and arrangements prevalent.	Vertical lines and arrangements.
Arch-piers very massive.	Arch-piers comparatively slender.
Vaulting simple and mostly plain.	Vaulting more complex and decorated.

Norman architecture, we may add, certainly contains many excellent rudiments and materials for a more finished style, and would no doubt have attained to greater consistency and variety, and increased in elegance and refinement, if the application of the pointed arch had not led to a system which completely superseded it. Still it is rather singular that, in an age when we confine ourselves to no one particular mode of building, but employ Grecian, Italian, Gothic, Tudor, Elizabethan, &c., as taste or circumstances may dic-

tate, no attempt should have been made to revive this particular style. It is true that it presents no models for direct imitation, even for purposes of modern church architecture; it would require to be greatly modified; to have much supplied, in order to accommodate it to present usages; to be purified of much uncouthness; to be, in a word, remodelled: still, on that very account, does it recommend itself—not indeed to those who have no other guidance but precedents—but to those who are capable of entering into its spirit, able to discriminate between its valuable qualities and its defects, to treat it with originality, and to give free scope to their own inventive powers; just as Gärtner and some other modern German architects have formed a style of their own, taking for the basis of it one which may be considered the parent stock of both Lombardic and Norman, namely, the Byzantine, of which the round-headed arch constitutes a characteristic feature.

**NORMANDIE**, one of the provinces or military governments into which, before the French revolution, France was divided. It stretches along the coast of La Manche, or the English Channel, from near the mouth of the Somme, to the western side of the peninsula of Cotentin, which is included within it. It is bounded on the north and west sides by the sea, on the north-east by Picardie, on the east by the Ile de France, on the south-east by Perche, on the south by Maine, and on the south-west by Bretagne. It comprehended a number of subordinate divisions, which we give, adding the name and population of their chief towns, according to the census of 1831.

#### LA HAUTE NORMANDIE, capital Rouen.

Le Pays de Caux	Cauvabec	2,832
Le Pays de Bray	Neufchâtel	3,430
Le Vexin Normand	Gisors	3,533
Le Roumois	Rouen	88,086
Le Pays de la Campagne	Evreux	9,963
	Breteuil la Guérande	—
Le Pays d'Ouche	Glos la Ferrière	—
Le Pays de Lieuvin	Lisieux	10,257
Le Pays d'Auge	Pont l'Evêque	2,118

#### LA BASSE NORMANDIE, capital Caen.

La Campagne d'Alençon	Alençon	14,019
Le Pays d'Houlme	Domfront	1,873
La Campagne de Caen	Caen	39,140
Le Bessin	Bayeux	10,303
Le Bocage	Vire	8,043
Le Cotentin	Coutances	8,957
L'Avranchin	Avranches	7,269

Le Vexin Normand was so designated to distinguish it from that portion of Le Vexin which was in the early ages included in the domains of the crown, and entitled *Le Vexin Français*.

The population of the five departments into which Normandie has been divided, with the exception of the arrondissement of Mortagne in the department of Orne, which comprehends a portion of the county of Perche, was, in

1831, 2,520,018. The greatest length of the province, from north-east to south-west, from the neighbourhood of Eu on the Bresle to that of Pontorson on the Couesnon, is about 170 miles; the greatest breadth, at right angles to the length, from Cape La Hague or La Hogue, at the extremity of Le Cotentin, to the neighbourhood of Domfront, is 110 miles. The area may be estimated at about 11,100 or 11,200 square miles, giving 225 to 227 inhabitants to a square mile, a density of population far above the average of France. This area is nearly double that of Yorkshire.

A detailed description of the country is given under the departments into which it is now divided. [CALVADOS; EURE; MANCHE; ORNE; SEINE INFÉRIEURE.] Normandie contains no great elevations, except in the south, where it is traversed by the eastern prolongation of the Armorican chain of hills, and in the west, where a branch of that chain extends into the Cotentin. It is watered on the east side by the Seine and its tributaries the Eure and the Rille; in the centre by the Orne, Dives, and Touques; and in the west by the Douve, Vire, Sée, and Celune. The climate is moist and temperate, and the soil produces abundantly all sorts of grain; apples and pears are grown in great quantity, from which are made cider and perry, the common drink of the peasantry, who grow no wine. The meadow and grass lands are extensive and excellent, and afford pasturage to numbers of cattle and horses. The tables of population given above will show that Normandie contains many important towns. Manufactures are common, especially of cotton; and along the coast are the ports of Dieppe, Le Havre, Honfleur, Isigny, Cherbourg (for the navy), and Granville.

The country which afterwards constituted the duchy of Normandie was, in the earliest period of Gallic history, inhabited by a number of Celtic nations. The Baiocasses, Viducasses, Lexovii, and Aulerici Ebuovices inhabited the districts now chiefly comprehended in the departments of Calvados and Eure; and their territories comprehended the following Celtic or Roman towns:—Baiocasses—Arægenus, afterwards Baiocasses (Bayeux), and Grannona (Port-en-Bessin), on the coast near Arægenus; Viducasses—Viducasses (Vieux), near the Orne above Caen; Lexovii—Noviomagus, afterwards Lexovii (Lisieux), and Breviodurum (Pont Audemer) on the Rille; Aulerici Ebuovices—Mediolanum, afterwards Ebuovices (Evreux), Condæ (Condé sur Iton) above Evreux, and Uggade (Pont de l'Arche) on the Seine. The other nations and towns are noticed elsewhere. [MANCHE; ORNE; SEINE INFÉRIEURE.] These nations were all included in the Roman province of Lugdunensis Secunda, which nearly coincided with the subsequently established duchy of Normandie, and of which Rotomagus (Rouen) was the capital. This part of Gaul was, on the downfall of the empire, conquered by Clovis (A.D. 497-500), and incorporated by him in the kingdom of the Franks. In the division of the Frankish territory among the sons of Clothaire I., it was included in the kingdom of Neustria, which comprehended the country between the Channel and the Loire, the middle of Champagne, and the frontier of Bretagne. On the etymology of the name Neustria scholars are not agreed: it seems to include the same element as our own word 'west' and the French 'ouest,' with the addition of the initial consonant.

In the attacks of the Northmen or Danes on France, Neustria had its share of the general devastation. Among the most formidable of their chieftains was Rollon or Rollo,\* who first attacked France in A.D. 876: he ravaged alternately the north and the south of France, the Low Countries, and England; and in A.D. 911 he led a numerous army from the last-mentioned country to the siege of Paris. He extended his ravages in every direction; and though he experienced some reverses, and appears to have failed in his attempt upon Paris, he received, from the weakness or policy of Charles le Simple, king of France, the hand of his daughter Gisele or Giselle in marriage, with the cession of an extensive province, to be held as a fief, on condition of his ceasing to ravage the rest of the kingdom and making profession of the Christian religion. The ceded province was north of the Seine, and extended from the Epte to the sea; it became the duchy of Normandie, so called from the Northmen, or (to give them their more familiar designation) the Normans (in French, Normands), by whom it was possessed. A circumstance which occurred at the conference held for confirming the treaty is in-

dicative of the situation and character of the parties. Rollo, having refused to kneel before the king and to kiss his feet in recognition of his sovereignty, commanded one of his soldiers to perform for him these acts of homage. The rude soldier, seizing the king's foot, handled it so roughly as to overturn him from his chair, amid shouts of laughter on the part of the Normans, and a prudent silence on the part of the king's French attendants. As the province had been utterly wasted by the ravages of the invaders, the counts of Dol and Rennes in Bretagne were pledged to furnish provisions to the new settlers; and the king ceded to Rollo his claims to the sovereignty of that part of Bretagne which had ceased to recognise the authority of the crown of France.

The conversion of the northern pirates into cultivators of the soil which they had previously ravaged, is one of the remarkable historical features of the dark period which succeeded the downfall of the Western empire, and in no instance was the change more striking and more complete than in the case now before us. Much is doubtless to be ascribed to the personal character of Rollo, who appears to have possessed qualifications far beyond those of an ordinary sea-king. He introduced the feudal system in a completeness and regularity to which it had not attained in those parts where it had been the growth of many years and of various circumstances. The first fiefs granted by him were to some of the churches of his duchy, the rest of which he divided into counties and distributed among the chief officers of his army. The Normans applied themselves with energy to the cultivation of the ravaged lands; strangers from all parts were invited to settle within the duchy, and so severely and successfully were the laws administered for the protection of property, that it is said that a bracelet which Rollo suspended from an oak in a forest near the Seine remained untouched for three years. The anecdote may be apocryphal, but it shows the opinion entertained of the efficiency of his police. He rebuilt the ruined churches and took every precaution for the defence of his territories against the attacks of other pirates, enclosing the towns with walls, securing the mouths of the rivers by barricades, and keeping up the valour and warlike skill of his subjects by hostilities along his frontier, especially against the Bretons, whom he reduced to subjection.

The number of warriors whom Rollo established in his new settlement is calculated, by M. Simon de Sismondi (*Hist. des Français*, pt. ii., c. xiii.), at not more than 30,000, but the energy which this admixture of a new and warlike population infused into the degenerate population of France rendered their establishment an event of great importance. They effected few external changes; they adopted the language, the social and political institutions, and the religion of the nation which they had conquered; but they imparted to each that vigour which was the characteristic of their own nation. The rude dialect, formed by a corruption of the Latin language, which was then common in France, became in their hands a regular and a written language, embodied in their judicial code or in the poetry and romance which constituted their popular literature. The feudal system received from them, as already noticed, its most complete and regular form; and acquired a stability which rendered it an important instrument in the restoration of social order in Europe. Their attention to the sermons and the scholastic and catechetical instructions of the clergy was marked by the same assiduity which characterised their other pursuits; and the faith of their Scandinavian fathers was abandoned for the profession of Christianity, of which the churches and the priests had been, during their piratical career, the objects of their bitterest hostility.

Some years after the establishment of the duchy, a new invasion of France by the piratical Northmen took place (A.D. 923-927), and the invaders, when defeated, found shelter and assistance among the subjects of Rollo, by whose support they were enabled to renew their ravages. The cession of Le Bessin, or the territory of Bayeux, and of a portion of Maine, bought off the duke of Normandie, and the pirates, left to their own resources, were almost entirely destroyed in a battle near Limoges.

Rollo abdicated his duchy (A.D. 927) in favour of his son. An ancient writer has recorded the form of words used by him: 'C'est a moi de mettre mon fils à ma place, et à vous de lui garder fidélité.' The time of his death is not clearly ascertained; he lived certainly one year, perhaps five years after his abdication.

\* His name is variously written—Rolf, Rou, Raoul, or Harvul. He is also called Robert.

Guillaume (William) I., called *Longue Epée* (long-sword), was the successor of Rollo. He contracted alliances by marriage with some of the most powerful of the French nobles, and gained several advantages over the Breton chiefs who opposed him. He received from Raoul or Rodolphe, king of France, the cession of *Le Cotentin* and *L'Avranchin*, which he added to his dominions. He had a principal share in the restoration of Louis IV. d'Outre-mer to the throne of France; but in the civil dissensions of France, he forsook his party for that of Otton or Otho the Great of Germany, rival of Louis. He returned however to his allegiance (A.D. 942) after a time, and was reconciled to the king. He afforded an asylum to Harold or Harald VII., king of Denmark, whom he restored by an armed force to his throne. Guillaume was assassinated by the attendants of Arnolphe, count of Flanders, at a conference which he held with that noble at Pecquigny on the Somme (A.D. 942), just as he was on the point of abdicating his duchy to assume the habit and vows of a monk.

The assassination of Guillaume brought the duchy into great peril. He left no legitimate offspring, but his natural son Richard I., afterwards called *Sans-peur* (the fearless), a boy of ten years, was recognised as duke by the Normans, and placed by them under the care of three or four guardians, of whom two at least were recent emigrants from Denmark, and had not renounced paganism. Louis IV. d'Outre-mer, king of France, hastened to Rouen (A.D. 943) and secured the person of the young duke, whom the Normans, not without some distrust, allowed him to convey to Laon, that he might be there brought up in a manner befitting his rank and prospects. Hugues, duke of France and count of Paris, also interfered in the affairs of the duchy, and both he and Louis justified their intervention by urging the necessity of excluding the pagan guardians, and diminishing their influence and that of the other adventurers who had arrived, during the ducal reign of Guillaume, from the north. A period of general dissension ensued, and the warfare assumed a partially religious character. Louis of France, involved in a harassing contest with his vassals, and especially with Hugues, sought to make up his quarrel with the latter by an agreement for the partition of Normand; and these two, uniting their forces, attacked the duchy one side, while it was assailed on the other by the Bretons, who gladly seized so favourable an opportunity of throwing off the Norman yoke. The address and perseverance of Bernard the Dane, regent of Normand, triumphed over these difficulties. He drew off Louis from his agreement with Hugues, and called in Harold, or Aigrold, king of Denmark, to the support of Richard, who had been delivered from his virtual captivity at Laon by an adroit stratagem (A.D. 944). Louis was shortly afterwards (A.D. 945) seized and detained captive at Rouen by Bernard, in consequence of an affray between his attendants and those of Harold, and obtained his release, on conditions highly favourable to the Normans, only to pass into another captivity in the hands of Hugues of Paris, by whose intervention the Normans had let him go. He remained a year in this second captivity, and his release (A.D. 946) was soon followed by a renewal of the war, in which Richard and Hugues were in alliance against Louis and his supporters. In this warfare Richard grew up, signalling his courage and obtaining thereby his distinguishing epithet of *Sans-peur*. Louis (A.D. 954) and Hugues (A.D. 956) died leaving their children minors; and the obscure annals of the following years present little worthy of notice.

In the reign of Lothaire, son and successor of Louis IV., new attempts, either by treachery or force, were made on the person and dominions of Richard (A.D. 963), who resorted for assistance to the king of Denmark and obtained the support of an auxiliary force. By the ravages of this barbarous soldiery the king and his chief adviser, Thibaut, count of Chartres, were obliged to sue for peace. On the death of Louis V., successor of Lothaire, Richard was one of the most energetic and influential supporters of Hugues Capet, in his acceptance or perhaps usurpation of the throne of France (A.D. 987). Richard died at Fécamp (A.D. 996), after a reign of fifty-three years, in which he had displayed the qualities which then ranked highest in public esteem.

The early part of the reign of Richard II., surnamed *Le Bon*, was distinguished by an event little noticed in history, but presenting one of the most remarkable phenomena of the period. The peasantry of Normand, consisting of the descendants of Romanised Gauls and Franks, of those who

had been reduced to or retained in an inferior condition by the settlement of the Northmen under Rollo, and of those who had subsequently emigrated from other parts of France, determined on claiming an equality of privilege and station with their northern conquerors. In this resolution indeed nothing more is discernible than the impatience of degradation and wrong, and the sentiment of national independence, which distinguished other popular outbreaks of this and subsequent periods. The singularity of the proceeding consists in the deliberation and caution with which it was conducted.

Secret assemblies were held in each county of the duchy, and two deputies were appointed by each to meet in a general assembly in a central place, to maintain their pretensions to perfect equality with the dominant race. The plan was however discovered. A band of soldiers, despatched by the duke, surprised the general assembly at its sitting, seized the deputies and others of the peasantry, and causing them to be mutilated by cutting off their hands and feet, sent them home to strike general terror. The design was abandoned, and the peasantry resigned themselves to a servitude against which they deemed it in vain to struggle (A.D. 997).

The reign of Richard II. is also remarkable for the first establishment of a connection between the affairs of Normand and England, then governed by Ethelred II., the weakest prince of the Anglo-Saxon dynasty. The first incident which brought the countries into contact was the marriage of Ethelred with Emma, the sister of Duke Richard (A.D. 1002). In the following year hostilities appear to have broken out between the two powers, and a force, landed from an English fleet, was repulsed in an attempt to ravage the duchy. At a subsequent period Ethelred, when attacked by Sweyn, king of Denmark, and abandoned by his subjects, took refuge in Normand (A.D. 1013-14); until recalled by his subjects. On his death, his wife Emma and her children returned to Normand, and remained under the care of Richard, who however took no active measures for asserting the claim of his nephews against the Danes. Emma herself married Canute the Dane, the usurper of her children's inheritance.

Another remarkable event marked this reign. Rodolph, a Norman chieftain, who had some complaint against Richard, proceeded with many companions to Rome, in the double character of a pilgrim and an appellant to the authority or influence of the pope (A.D. 1016). By the advice of the pontiff he engaged in the service of the Lombard princes of Benevento, and attacked the Greeks of Apulia, which country was then subject to the emperors of Constantinople. Many young Normans, encouraged by Duke Richard, engaged in the service of Rodolph; and this expedition, in the course of a century, led to the establishment of a Norman dynasty on the throne of the two Sicilies. [SICILIES, KINGDOM OF.]

In the internal dissensions of France, Richard II. was commonly the faithful supporter of King Robert, who had succeeded his father, Hugues Capet. He was engaged in various struggles with the other powerful nobles of that kingdom; in his contest with Eudes II., count of Champagne and Blois (A.D. 1016-23), he scrupled not to summon to his aid the savage hosts of Norway and Sweden, and the terror caused by the arrival of these allies led to an accommodation.

On the death of Richard II. (A.D. 1026 or 1027), his eldest son Richard III. succeeded to the throne. Soon after his accession he had a war with his brother Robert, who had inherited a district of the duchy in subordination to the duke. He obliged him to submit; but, immediately on his return to Rouen, he died under circumstances which led to a strong suspicion of poison; and the vacant duchy was seized by Robert, whose character and exploits obtained for him the twofold epithet of *Le Magnifique* (the magnificent) and *Le Diable* (the Devil). He had to struggle against the rebellion of his vassals, who were encouraged to resist him by the odium which attached to him as the reputed murderer of his brother and lord. But he triumphed over these opponents, and became the arbiter of the disputes among his neighbours, restoring Baudouin or Baldwin of Flanders to his country (A.D. 1030), and enabling (A.D. 1031) Henri I. to mount the throne of France in spite of the opposition of Constance, the queen-mother, and her younger son Robert, duke of Bourgogne. Henri, in return for his powerful support, ceded to him as a fief the district between the Epte



and the Oise (*Le Vexin Français*). In 1034 Robert equipped a fleet for an expedition to England, in order to restore Alfred and Edward (afterwards the Confessor), the children of Ethelred II. by Emma, to the throne of their ancestors, then usurped and occupied by Canute the Dane. The fleet was however driven back by a tempest, and Robert, changing the direction of the force he had gathered, sent it into Bretagne, and compelled Alain or Alan, who then held that duchy, to do homage to him. Robert shortly afterwards set out on a pilgrimage to the Holy Land, after having recommended his only son William the Bastard, a boy of eight years, to the fidelity of his nobles; and died at Nicæa in Bithynia, A.D. 1035.

Guillaume (William) II., known at first, from the illegitimacy of his birth, by the surname of 'the Bastard,' afterwards, from his acquisition of England, by the more respectful designation of 'the Conqueror,' had been, before his father's departure, taken to the court of Henri I. of France, and entrusted to his care. On the death of Robert, Henri took his young ward to Rouen, and established him in possession of his father's dominions, except *Le Vexin Français*, which in the time of his own difficulties he had given to Robert as the price of his aid, and which he now retained.

The tender age of the young duke, and the stain attaching to his birth, encouraged several of the chieftains of Normandie to dispute his claim or to rebel against his authority. Guido, or Gui, count of Macon, grandson, by his mother, of the duke Richard II., was his most formidable competitor; and the Norman nobles, embracing one side or the other, and seizing the opportunity of civil discord for revenging their private quarrels, fortified their castles, and spread the flames of war throughout the duchy. The desolation caused by these and similar feuds, not only in Normandie, but in all parts of France, led the clergy to attempt the establishment of 'the peace of God,' which would have caused the almost entire cessation of private war. The attempt was too much at variance with the state of society and the spirit of the age to be effectual; but when the priesthood, instructed by experience, set themselves to limit and regulate an evil which they could not suppress—when, under the title of 'the truce of God,' they secured certain periods of time, and portions of territory, and classes of persons, from the violence of warfare, their benevolent aim was more successful. The confusion and troubles of Normandie continued however during the minority of Guillaume, whose courage, steadfastness, and vindictive character, were developed and strengthened by the scenes amid which he grew up. His ducal rank was preserved during his minority, rather by the mutual jealousies of his subjects than by his own power; but as he approached manhood he was enabled to maintain his authority; and in a victory, obtained at Val des Dunes, between Caen and Argentan (A.D. 1047), he crushed his most formidable competitor, Guido of Macon, who was supported by nearly the whole body of Norman nobles. Henry I. of France was present at this battle, with an auxiliary force of 3000 men, on the side of Guillaume.

By the consequences of this victory, and of subsequent advantages which he obtained over other assailants, Geoffroy Martel, count of Anjou (A.D. 1048), and Guillaume, count of Arques, an illegitimate son of Richard II. (A.D. 1054), the power of Guillaume was so far consolidated as to lead him to extend his ambitious views to foreign lands, and especially to the British Islands.

When Ethelred II., king of the Anglo-Saxons, died, his wife and children returned to Normandie, where the latter grew up, and remained until one of them was invited into England, where he was murdered, and the survivor, Edward the Confessor, was elevated (A.D. 1042) by the nobles and clergy of England, under the influence of Godwin, to the now vacant throne of that kingdom. Edward was in manners, language, and affections a Norman rather than a Saxon; and his reign of twenty-three years (A.D. 1042-1066) was chiefly occupied by a struggle between the Normans, with whom the king had surrounded himself, and the Anglo-Saxon or native party under Earl Godwin and his sons. [HAROLD II.] This predilection of Edward for his Norman relatives and friends encouraged the ambition of Guillaume, who visited England with a large retinue, or even armament, at the time of the predominance of the Norman party. 'As he journeyed through the land of the English,' says a modern writer, 'the Duke of Normandie might have believed for a moment that he was still in his own territories. The fleet which he found at Dover was

commanded by Normans; and at Canterbury some Norman soldiers composed the garrison of a fort built on the declivity of a hill. Crowds of Normans came to salute him in the dress of captains or prelates. Edward's favourites came to pay their respects to the chief of their native country; and, to use the language of that day, thronged round their natural lord. William appeared in England more like a king than Edward himself; and it was not long before his ambitious mind conceived the hope of becoming so without difficulty at the death of this man, whom he found a slave to Norman influence.' (Thierry, *Conquête d'Angleterre*, liv. iii.) The fluctuations of the struggle between the parties at the English court do not belong to our present subject; and the events which led to the accession of Guillaume to the English throne are described elsewhere. [HAROLD II.]

Henri I. of France had supported the count of Arques against Guillaume, and he subsequently (A.D. 1058) attacked Normandie, but without success. A peace was concluded next year, and continued for the remainder of the reign of Henri, and a portion of the reign of his successor Philippe I. During the troubles of Anjou, the succession of which was disputed, and while Bretagne was torn by internal dissensions, Guillaume seized his opportunity, and wrested the suzerainty of Maine from the rival counts of Anjou. He also carried on war with the Bretons, over whom he gained some advantages (A.D. 1065) a year before his expedition to England. He set sail for the conquest of England from St. Valery-sur-Somme on Michaelmas-day, A.D. 1066.

A revolt of the people of Le Mans, who afterwards submitted (A.D. 1068-1070), is among the indications of the rising spirit and importance of the inhabitants of towns; and led, though unsuccessful in its immediate object, to the formation of municipalities in most parts of France. Troubles of greater extent followed. Guillaume had, soon after the conquest of England, during a fit of illness, designated his eldest son Robert as his successor in the duchy, and caused the Norman grandees to do homage to him as their duke; but on his recovery, he had not only refused to deliver over to Robert the government of the duchy, but withheld from him the county of Maine, which had been granted to him as his wife's dowry. According to other accounts, William, on setting out for the conquest of England, had engaged to Philip, king of France, in order to obtain his consent to the enterprise, that he would, if successful, resign his continental dominions to Robert. (*L'Art de vérifier les Dates*.) These and other wrongs, real or imagined, drove Robert into exile, and led him to make incursions into Normandie, which were repressed by Guillaume. In 1087 Guillaume demanded of Philippe I. of France the restitution of *Le Vexin Français*, which had been withheld from him by Henri I. Philippe refused: war ensued, and an accident which occurred in the course of it led to the death of Guillaume, after he had governed the duchy of Normandie fifty-two years.

On the death of Guillaume, Robert became duke of Normandie, and returning from exile, took possession of his inheritance. He made a vain attempt, by means of his partisans, to possess himself of England, which had fallen to the share of his next brother Guillaume le Roux, or William Rufus or the Red (A.D. 1088). The misconduct of Robert, and the intrigues of his brothers, excited general discontent in Normandie. In the universal confusion, the people of Le Mans and the county of Maine again revolted; and the citizens of Rouen, of the party of Guillaume, introduced a body of the troops of that king within their walls. The citizens and their auxiliaries were however defeated by Henri, count of Coutances and Avranches (afterwards Henry I. of England), the youngest of the Conqueror's sons, who, on this occasion, supported Robert (A.D. 1090). Guillaume soon after landed in Normandie; and he and Robert made up their quarrel, and uniting their forces, deprived Henri of his two counties and drove him into exile (A.D. 1091). They divided his lands between them, and Guillaume returned home. The weakness of Robert encouraged the licentious violence of his barons, and Normandie continued to be the scene of confusion; until the duke, eager to engage in the first crusade, pledged his dominions to his brother the king of England for a sum of money, and embarked for the Holy Land (A.D. 1096). Guillaume, thus possessor of the duchy, renewed the contest with Philippe for the possession of *Le Vexin Français*, and sought to recover Maine, but his projects were cut short by death (A.D. 1100).

The death of William and the absence of Robert gave opportunity to Henri to seize the throne of England; but his hands were too full to allow him to make any attempt on Normandie, which quietly submitted to the dominion of Robert on his return (A.D. 1101) from the crusade. In 1102, at the invitation of his partisans, Robert landed in England to dispute the crown of that kingdom; but seeing little hope of success, came to an agreement with his brother, and returned. The political necessities of Henri obliged him to leave Robert for a time in possession of Normandie, which, under his weak sway, was torn by anarchy and dissension; but as Henri gained stability, he began his encroachments on his brother, whom (A.D. 1106) he assailed with an army of Anglo-Normans. The discontent of Robert's subjects favoured his designs: he took Bayeux after a stout resistance, and burned it, and Caen surrendered; but Falaise and Tinchebray resisted. The two brothers engaged in conflict under the walls of the last-named town; Robert was defeated and taken, and an English army conquered Normandie, as, forty years before, a Norman army had conquered England. Robert died, after a long captivity, A.D. 1134. [HENRY I.]

Henri governed with vigour the country which he had unjustly acquired. He put a stop to internal warfare, resumed or compelled the restoration of many grants made by his brother, restored to the Church the possessions that in a time of discord had been wrested from it, and regained possession of all that had belonged to his father. His attempts to possess himself of the person of Guillaume, son and heir of Robert, who took refuge in France, led to mutual jealousy and distrust between him and Louis VI. *Le Gros*, king of France. The counts of Flanders and Anjou allied themselves with Louis, and war broke out (A.D. 1108), and continued for two years. After a short cessation it broke-out again (A.D. 1111), and the discontent of some Norman lords added to the difficulties of Henri; but he managed to draw the count of Anjou over to his side: the count of Flanders was dead, and he forced Louis to conclude a disadvantageous peace (A.D. 1114).

Guillaume, the son of Robert, was now of age; and compassion for his lot and that of his captive father, and dislike to the stern government of Henri, had disposed the Norman lords to revolt. Louis and the young count of Flanders embraced the party of Guillaume, and attacked Normandie, but without success (A.D. 1117). The count of Anjou having joined their party, they renewed their attack; the Norman lords revolted (A.D. 1118), and Henri seemed on the point of losing the duchy; but a succession of favourable events enabled him to regain the superiority, and by the mediation of the pope, Calixtus II., peace was restored (A.D. 1119). New discontents and troubles broke out after the death of Guillaume, the only legitimate son of Henri, who was drowned in his passage from Normandie to England (A.D. 1120). It is likely that these discontents were caused or augmented by the fear that Normandie and England would become mere provinces of Germany by the marriage of Maud, or Mathilde, daughter and heiress of Henri, with the emperor of Germany, Henri V., which had taken place A.D. 1114, when the princess was only ten years old. The king of England however obtained the recognition of his daughter as heiress to England and Normandie, and after the death of her husband the emperor (A.D. 1125) married her A.D. 1129, notwithstanding the repugnance of his nobles, and of Maud herself, to the son of the count of Anjou, Geoffroi Plantagenet, who succeeded, by the abdication of his father, to the county of Anjou and its dependencies, in the same year in which the marriage was celebrated.

The death of Guillaume, son of Duke Robert, and claimant of Normandie (A.D. 1128), seemed to secure the great object of Henri's cares, the quiet succession of his daughter. But notwithstanding this favourable event, his latter days were embittered by the quarrels of himself and his daughter with Geoffroi of Anjou; and on his death (A.D. 1135), his cares were frustrated by the usurpation of his nephew Etienne, or Stephen, count of Boulogne. Usurpation led to civil war, and both England and Normandie suffered from a long series of hostilities, and from the consequent social disorganization. Geoffroi and his allies, with a powerful army (A.D. 1136), entered the duchy, which was almost defenceless; but the cruelty of his ravages provoked the hostility of the people, who were disposed to recognise him; and the resistance of the peasantry, and a wound which he received, led to his retreat. Etienne passed over from Eng-

land to Normandie (A.D. 1137), and did homage to Louis VI. for that duchy; but he too displeased his subjects and returned to England, and the duchy remained without a master until A.D. 1144, when it was conquered by Geoffroi, who, in his turn, did homage for it to the king of France, now Louis VII., and Maud exercised a government little more than nominal until A.D. 1151, when Geoffroi died, and was succeeded in his Anjevin and Norman states by his son Henri, afterwards Henry II. of England.

Henri had indeed been invested with the rights of his parents over Normandie before Geoffroi's death (A.D. 1150), and the recognition of his investiture by the king of France had been purchased by the cession of *Le Vexin Normand*. In A.D. 1152 he married Eléonore, duchess of Aquitaine from whom Louis VII. of France had just been divorced. This union, by uniting under one chieftain Normandie, Anjou, and Aquitaine, rendered his power superior to that of the king of France: he managed to break up a hostile league formed against him, restored to his domain many fiefs which his father had alienated, repressed a rebellion of the barons of Aquitaine, and, in 1154, raised his greatness to its acmé by his succession, on the death of Etienne, or Stephen, to the crown of England. His right to Anjou was disputed by his younger brother Geoffroi, on the ground that his father had bequeathed it to him. This was true, and Henri had sworn to execute his father's will; but the pope absolved him from the obligation of his oath: the king of France, who had undertaken Geoffroi's cause, was won over by his address; and the defrauded prince was obliged to content himself with lands unfortified and a pension from his brother (A.D. 1156).

The talent and ambition of Henri, his extensive plans of aggrandisement, his struggles with Louis VII. of France, and his memorable contest with Becket, are recorded in another place. [HENRY II.] The history of Normandie is involved in that of the sovereign. In 1168 Henri invested his eldest son (also called Henri) with the duchy, but did not admit him to the administration of the government; and this constituted one of the grievances alleged by the young prince to justify his subsequent rebellion. Louis VII. of France, who supported him, besieged Rouen, which, by a gross breach of faith, he was on the point of taking (A.D. 1174). The arrival of Henri with a strong body of Brabançons, or mercenaries (whose employment was gradually preparing the downfall of the feudal system), compelled him to raise the siege, and peace was soon after restored. Henri died in 1189, worn out and broken-hearted by the ingratitude and perpetual rebellions of his children. His eldest and third sons, Henri and Geoffroi, had preceded him to the tomb.

Richard Cœur-de-Lion or the Lion-hearted succeeded his father in Normandie as well as in England. He had, before his father's death, and while in rebellion against him, done homage to Philippe II. Auguste, king of France, for the duchy and all the other fiefs possessed by his father in France. He was crowned as duke of Normandie after his father's death and before his own departure on the third crusade. [RICHARD I.] During his captivity in Germany the duchy was attacked by the king of France, who took several towns, but failed in his attempt on Rouen (A.D. 1193). The treachery of Prince Jean or John, Richard's brother, afforded him a fair prospect of wresting the duchy from its rightful owner; but the release of Richard and the double treachery of Jean frustrated his plans, and a petty yet destructive war followed, which, though interrupted by a short peace between the two kings, and by some subsequent temporary suspensions of arms, continued till the death of Richard (A.D. 1199), an event which happened in the course of an obscure struggle, but which led to consequences of the most important character, especially to Normandie.

The duchy of Normandie was now fast approaching the term of its existence. The conquests and other acquisitions made by its rulers had in reality impoverished and weakened it. The energies of William the Conqueror were, after his invasion of England, directed to the confirmation of his successful dominion over that kingdom. The weak and unsteady rule of Robert, his eldest son, prevented a separation which might have protracted the power and the existence of the duchy, and threw the government into the hands of Henri I., who entertained a jealousy of the native Normans, and limited his favour and confidence to Anglo-Norman and Breton chieftains. The extension of the domains of Henri II. divided his attention, and provoked genera-

jealousy of his ambition and power; and Richard had wasted his strength in the crusades, and in a petty warfare with the king of France. But the energy which marked the character of these Anglo-Norman princes protracted the downfall of a power which seemed to threaten the independence of the rest of France, and which downfall immediately followed the acquisition of the sovereignty by a weak hand.

The dominions of Richard passed into the hands of Jean, or John, his youngest brother; but his claim was disputed by Artur, or Arthur, duke of Bretagne, son of Geoffroi, the third son of Henry II. There can be no doubt of the superiority of Artur's claim; but his tender years prevented his availing himself of it; and Jean, who showed more vigour and address in his usurpation than at any other period of his life, established his power with little difficulty (A.D. 1199). Philippe however embraced the cause of Artur, and though he abandoned it for awhile in a treaty with Jean (A.D. 1200), took it up again in a subsequent quarrel which he had with that prince. The capture of Artur (A.D. 1202), and his subsequent assassination by Jean at Rouen (A.D. 1203), put an end to the struggle. The crime however cost Jean his duchy; general indignation was excited by it: Philippe overran the duchy and took the strongest fortresses, not indeed without a brave resistance. Jean fled to England, and his subjects, abandoned by their prince, hastened to submit to the invader. Rouen was the last town to capitulate, and Normandie passed finally into the hands of the French king. Philippe accused Jean before the peers of France of the murder of Artur; and though such a tribunal had no cognizance of other crimes than those committed by a vassal against his suzerain, procured a sentence of forfeiture against him, by virtue of which the duchy was ever after united to the crown of France, though the legal act reuniting it in perpetuity to that crown was not executed till the reign of Jean II. of France (A.D. 1361).

In the wars of the English, under Henry V. and VI., Normandie came again into their hands, and was almost the last portion of France which they retained. They no longer however held it as a feudal duchy, but as a part of the kingdom of France to which they laid claim. The leading events which occurred in the duchy during that period are noticed elsewhere. [ARC, JEANNE, D'; BEDFORD, JOHN DUKE OF; CHARLES VII. (of France); HENRY V.; HENRY VI. (of England).]

(Sismondi, *Histoire des Français*; Thierry, *Conquête d'Angleterre par les Normands*; *L'Art de vérifier les Dates*, &c.)

**NORRKÖPING**, a town in Sweden, situated in 58° 36' N. lat. and 16° 28' E. long., on the banks of the river Motåla, which falls into an inlet of the Baltic, called the Brävieken, a short distance below the town. This inlet is about 22 miles long, with a breadth varying between half a mile and two miles, and has depth enough for middle-sized vessels, which may sail up to the town. Norrköping is built on both sides of the river. The streets are wide and generally straight, though the town stands on undulating ground; the houses, partly of wood and partly of stone, are only two stories high, but have a neat appearance. Among the public buildings none are distinguished for architectural merit except the town-hall. The manufactures are numerous, though commonly on a small scale. The most important are those of woollen cloth (of which in 1831 not less than 342,922 ells were made), in brass, which occupies more than three hundred persons, in snuff, and paper. Several vessels are annually built. The manufactured goods supply the most important articles for exportation, but they go only to the other towns of Sweden, especially to Stockholm. Iron is also an important article of export, as all the iron worked in Eastern Götaland is exported from this town. Most of the grain grown in the plain of Linköping is also shipped at this harbour. The town had, in 1831, 62 vessels at sea, carrying 3958 tons. The population did not much exceed 10,000 in 1833. It has several good institutions for education, a grammar-school, three free-schools for the lower classes and two for orphans. The Jews are permitted to settle in this town, and have a synagogue. Norrköping is situated in the district (län) of Linköping.

(Forsell's *Statistik von Schweden*; Schubert's *Reise durch das südliche und östliche Schweden*.)

**NORRLAND**. [SWEDEN.]

**NORROY**. [HERALDRY.]

**NORRSKA FIELLEN** (the Norwegian Range), a term lately introduced into geography to indicate the mountain-

mass which occupies with its branches the greater portion of the Scandinavian peninsula. This name is more properly applied to the southern portion of the range, which is sometimes also called the Dovre Field, though this name properly belongs to the most northern portion of the Norrska Fiellen. The northern portion of the range is called Kiölen. The boundary-line between the Norrska Fiellen and the Kiölen lies between 63° 30' and 64° N. lat., east of the Vårdals Fiord, the eastern portion of the bay of Trondhjem, where the range is less than 12 miles across, and presents one of the most convenient roads for passing it.

The range of the Scandinavian mountains begins on the south with Lindesnaes (or Lime-cape), the most southern extremity of Norway (south of 58° N. lat.), and extends to Cape Nordkyn (71° N. lat.) and the Varanger Fiord, over a space exceeding 1000 miles in length. The Norrska Fiellen is only about 360 miles in length, but it considerably exceeds the Kiölen range in width and in elevation.

The Norrska Fiellen occupies more than three-fourths of the southern part of Norway. Its elevated rocky masses approach close to the southern and western shores: on the east its boundary is determined by a line beginning on the south on the shores of the Skagerrack at the Langesunds Fiord (9° 40' E. long.), and thence drawn to the town of Trondhjem, though some of its lower offsets advance considerably to the east of that line. In the whole country west of this line there is no low level, except in the narrow valleys; but on the summits of the rocky masses there are extensive plains.

In the most southern districts, south of 59° N. lat., or of a line drawn from Lyse Fiord to Langesunds Fiord, the mountain-masses do not attain a great elevation. They rise from the sea with a steep ascent to the height of 300 or 400 feet; but at the distance of about 20 miles from the coast they hardly exceed 1000 feet in elevation. Farther north they rise still higher in the Heck Field and in the Bygle Field, which attains an elevation of 2000 feet above the sea. In the latter the upper part of the mountains begins to extend in plains. South of it they are broken into narrow ridges running north and south, and separated from one another by deep narrow valleys. These valleys, though they contain only a small portion of low and level land fit for agricultural purposes, are fertile, and being sheltered against the western and northern winds, have a more temperate climate than any other part of the globe under the same parallel. The declivities of the ranges, nearly to their summits, are covered with forests where they are not very steep, which contain large pines, birches, and beeches. The coast is much broken, but none of the numerous inlets advance more than 5 miles within the mountain-masses, and most of them not half that distance.

Bygle Field and the mountains south of it are only the southern slope of the whole mass. North of 59° N. lat. it attains, in the Yökle Field, an elevation of about 4500 feet, which may be considered as the general height of the Norrska Fiellen as far as the Dovre Field, whose branches extend to 63° N. lat. The highest part of the rocky masses is towards the western shores. These shores are cut up in a very remarkable manner by numerous inlets, which are generally only a few miles wide, but penetrate to a great distance inland, some of them 70 and 80 miles, between the huge mountain-masses that enclose them. Along the open sea and close to the water's edge the mountains are on an average between 600 and 1000 feet high, and they continue to rise as they proceed eastward; so that at the distance of 10 or 15 miles they attain the general level of about 4500 feet, which they preserve for more than a hundred miles. They form indeed an elevated plain of uneven surface, on which are scattered bold peaks, rugged precipices, and extensive lakes. The general elevation of the plain does not rise above the line of perpetual congelation, which in 60° N. lat., in this country, is said to occur at an absolute height of 5600 feet, and in 62° N. lat. at 5100 feet; but it rises considerably above the line of trees, which cease to grow, even in a stunted state, below the height of 4000 feet. The surface of the plain consists either of barren naked rocks, or is covered with extensive morasses. In some places there are tracts on which heath and lichens are thinly scattered. These tracts are inhabited by the rein-deer and lemming. Here and there a few depressions occur in the plain, which in summer are covered with a scanty growth of grass, and



are pastured for about two months; but they are from 50 to 60 miles distant from the nearest village. Along the western shores, owing to their steepness and the western gales to which the declivities are exposed, the mountains are quite bare. But along the shores of the inlets, or *fjorde*, there are level tracts of moderate extent, which are partly covered with tall pines, and are partly cultivated. The clear blue water of these inlets, the high mountains rising from their shores with a steep ascent, varied by the forests and cultivated spots, give to the whole a degree of beauty and sublimity which is hardly surpassed in any country on the globe. The scanty and scattered population find their subsistence mainly in the deep sea, which contains fish in abundance. The beauty of these inlets is sometimes much increased by the falls of water from the high rocks which surround them. Some of these falls pour down perpendicularly from a great height, as the Feigum Foss (or Fall), 700 feet, the Sevie Foss, 1000 feet, and the Keel Foss, 2000 feet. These three cataracts occur on the shores of the Søgne Fiord. On the Hardanger Fiord are the Skyttie Foss, 900 feet high, and the Børing Foss, likewise 900 feet high. The eastern declivity of the Norrska Fiellen may be considered to commence about 100 miles from the western coast, near 8° E. long. This slope is much less rapid than the western, occupying about 50 miles in width, and descending in this space about 4500 feet. Its surface is exceedingly broken, consisting of precipitous ridges, which have flat and sometimes extensive plains at their tops, and of deep narrow valleys. Though a few of the ridges, as the Halling Skarven (5436 feet), the Gousta Field (5522 feet), rise above the line of trees, the valleys and a large portion of the declivities of the lower mountains are covered with extensive woods, and the largest and best portion of the timber exported from Norway comes from this region. But the valleys are generally too high for cultivation, though they supply good pasturage. Many of the valleys are occupied by deep and extensive lakes, especially near the beginning of the descent. Several of these lakes are from 2000 to 3000 feet above the sea-level.

The highest part of the Norrska Fiellen is situated at the innermost recess of the Søgne Fiord, and is known by the name of Hurungerne. Its surface is covered with snow nearly all the year round. The Skagstøls Tind, which is 7647 feet above the sea, is the highest summit of this mountain-mass which has been measured. Contiguous to the Hurungerne, on the north-west, is the Søgne Field, which is somewhat lower; but west of the Søgne Field lie the Justedals, or Snee Bräen, an immense sheet of perpetual snow and ice, covering a surface of more than 600 square miles. This is by far the largest mass of ice in Europe, as the large snow-fields which surround the Finster Aarhorn and the Jungfrau do not occupy more than 200 square miles. The elevation of the Snee Bräen is not known, but it is estimated that the lower parts do not descend below 6000 feet, and that the more elevated portions attain 7000 feet above the sea. From the sides of this mass descend glaciers, which terminate in several lakes at their base. The Folge Fonden is another remarkable and elevated mountain-mass; it is situated on the southern shores of the Hardanger Fiord, and partly occupies the peninsula formed by this long frith and one of its branches, the Sör Fiord. The masses of ice covering its summit extend 25 miles from north to south, and about 10 miles in average width, so that they occupy a surface of 250 square miles. Its elevation is stated at 5427 feet, but as glaciers descend from the sides to a height of only 2000 feet above the sea-level, the summit must rise above the snow-line, as no glaciers can descend from a mountain which is not always covered with snow. Its elevation consequently must be greater, or the snow-line in 60° N. lat. must occur at a lower elevation than 5600 feet. We suspect the latter to be the case. From this glacier ice is brought to London when there has been no frost in England during the winter.

The most northern portion of the Norrska Fiellen is the Dovre Field, in the southern and highest part of which is the Snee-hätten (snow-hat), which rises to 7489 feet above the sea, and more than 3000 feet above the mountain plain on which it stands. The northern and lower parts of the Dovre Field approach the entrance of the Trondhiem Fiord or Bay of Trondhiem.

The mountain plains of the Norrska Fiellen terminate with the Dovre Field. East of 10° E. long. the rocky masses do not extend in plains, nor do they constitute a continuous

range; still the country between 61° 30' and 63° N. lat. and between 10° and 11° 30' E. long. is a mountain region, its surface being in general more than 2000 feet above the sea-level, and there being only a few valleys which sink below that elevation. Its surface is exceedingly broken, and presents a continuous succession of ascents and descents. Neither the mountains nor the intervening valleys occupy a large space; mountains generally extend from north to south, in the direction of the whole system, but they rarely continue for a few miles without being broken by deep depressions. Still more rarely do their summits present a level surface. Many of the valleys are only ravines, which however widen towards the border of the mountain-region so as to become narrow valleys, and to admit cultivation, which even extends on the declivities of the mountains to some elevation. The whole region is wooded, though the timber-trees are not so large as on the eastern declivity of the mountain-plains. Several of the mountains rise above the line of trees, but only a few attain the snow-line. The Tron Fiellet (near 62° N. lat.) is 5593 feet, and the Sylfiellen (near 63° N. lat.) is 5747 feet high.

The scanty population of the countries adjacent to the Norrska Fiellen, and the great facilities for communication by sea, account for the small number of roads which traverse this extensive mountain region. Only two roads are fit for carriages; one of these roads connects the two principal towns of Norway, Christiania and Bergen. It runs from Christiania northward, skirting the eastern shores of an extensive lake, the Rands Fiord, at the northern extremity of which it turns west, and begins to ascend the eastern declivity of the mountain mass. It passes over the tableland in a depression lying near 61° N. lat., between the Hurungerne on the north and Mount Sule Tind on the south. The highest point of the road does not much exceed 3000 feet above the sea, from which elevation it descends in a narrow valley between high mountains to the Søgne Fiord, and then traverses a hilly and broken tract till it reaches the Södra Oester Fiord and Bergen. The second road leads from Christiania to Trondhiem. It runs from Christiania north-north-east to the southern extremity of the lake of Mjösen; then along the eastern shore of that lake and the banks of the river Lougen, which falls into the lake. After ascending the valley of this river nearly to its northern extremity in a north-north-western direction, it ascends the Dovre Field in a north-eastern direction, passing near the base of the Snee-hätten, where it attains an elevation of more than 4500 feet. As snow-storms are very frequent even in summer in this elevated region, and travellers are exposed to great danger during these storms in an uninhabited region, four *field-stuer*, or houses of refuge, have been erected ever since the thirteenth century; they occur in a space of about ten miles. The road then descends in a northern direction to the valley of the Driv Elf, passes through a depression in the mountains into the valley of the Orkel Elf, and through another depression into that of the Guul Elf, which it follows to the vicinity of Trondhiem. A carriage-road leads from Trondhiem to Røraas, by which the produce of the copper-mines of the last-mentioned place is brought to the port to be shipped. This road follows the road to Christiania as far as it lies in the valley of the Guul Elf, and then runs along this river to its source, where it crosses a mountain-side, probably more than 3000 feet above the sea, west of the lake of Oresund, whence it descends to Røraas, which is somewhat more than 2500 feet above the sea.

The most frequented road, as it appears, is that which lies in the deep depression of the mountains between 63° 45' and 64° N. lat., which divides the Norrska Fiellen from the Kiölen, and by which the western districts of Swedish Norrland bring their produce to the harbour of Trondhiem, in preference to taking it to the harbours on the Gulf of Bothnia. It runs from the town of Oresund in Oresunds Län on the northern side of the lake of Störsjön, and after passing along the southern base of Mount Areskutan, which is 4775 feet above the sea-level, it traverses the boundary-line between Sweden and Norway, and its highest level occurs west of Stalstugan, where it is little more than 2000 feet high. Hence it descends in the valley of the Suul Elf to the eastern extremity of the Trondhiem Fiord, along the shores of which it continues to the town of that name.

North of the depression in which this road lies begin the Kiölen mountains, or the northern part of the Scandinavian range: they present a different character, forming a con-

tinuous range, which in general occupies a space of twenty-five miles in width. Between 64° and 68° N. lat. the range extends in a north-north-east direction, but farther north it runs north-east, and towards its northern extremity, north of 69° 30' N. lat., east-north-east. Between 64° and 65° N. lat. nearly the whole width of the mountain mass lies within the territories of Norway, but farther north, up to 69° N. lat., it is nearly equally divided between Norway and Sweden, the watershed constituting the boundary-line between these countries. Farther north the Kiölen mountains belong to Norway, except a small tract along the upper course of the Muonio river, which is under the dominion of Russia.

South of 66° N. lat. the highest part of the range is in the middle. It does not generally rise to a great elevation, though always above the line of trees; a few isolated summits are always or nearly always covered with snow. The declivity towards the east is not very steep, descending, in a distance of about ten or twelve miles, about 2000 feet to the base of the mountains, which is about 2000 feet above the sea-level. The lower offsets of the range extend however farther eastward to a distance of about 20 miles; they are commonly below the line of trees, and the valleys embosomed by them are often from six to eight miles wide, and generally covered with woods. The western declivity is exceedingly steep and broken. It descends, in a space of ten or twelve miles, from an elevation of about 4000 feet to the level of the sea. Rugged and precipitous masses of rock enclose long and wide valleys; the rocks are usually bare, or covered with heath and lichens, and sometimes with brushwood, but the valleys contain forests of fine timber-trees, especially that of the Namsen-elf. The elevated rocky masses extend to the very shores of the sea, which consist of a succession of deep inlets and projecting headlands. The Folden Fiord penetrates seventy miles into the rocky masses.

North of 66° N. lat. the high mountain-masses rise to a greater elevation, and occupy a much larger space. Numerous summits lie along the watershed, which are always covered with snow. The highest of these snow-capped summits is the Sulitelma, near 67° N. lat., which is 6155 feet above the sea. Here also the eastern declivity is not steep, but exactly resembles the descent farther south; towards the west however the high mountain-masses preserve a great elevation to the very shores of the sea. Cape Kunnen, near 67° N. lat., consists of rocks which rise in perpendicular precipices to the height of 1000 feet, and at a distance of about four miles inland they attain an elevation of 4000 feet. The whole rock is covered with perpetual snow, the glaciers extending on the south side to the very edge of the sea. This shows that the snow-mass by which this glacier is fed must be very extensive. No glacier occurs on the Norriska Fiellen and Kiölen mountains between the Justedals Bräen and Cape Kunnen. Other parts of the coast are less elevated, but in several places the mountains near the coast rise to 3000 feet.

The islands, which are numerous along the coast, must be considered as portions of the range, and the mountains of which they consist rise to a great elevation. The island of Alsten, which is of moderate extent, rises almost perpendicularly out of the sea, and the seven pointed peaks with which it terminates ascend far beyond the region of snow, rising to more than 4500 feet, whilst the snow-line hardly exceeds 4000 feet. The mountains on the island of Dunnöe are above 3000 feet high. The valleys, which are enclosed between the high masses of the continent, are deep and rather narrow; though in general well wooded, they do not contain timber-trees, and the soil is not adapted to agriculture, except in a few places.

The Sulitelma is the highest mountain in Europe north of the Polar circle. It has been examined by Wahlenberg, a Swede, who found that the snow-line on the Swedish side occurs at about 3800 feet, but on the western declivity it descends nearly 1000 feet lower. The vegetation on the two sides therefore differs considerably. In Sweden the fir-trees ascend the declivity of the Sulitelma to about 1200 feet, the pines to 1400 feet, and the birch to 2100 feet. A mountain on which the birch does not grow is called *fiell*. Above 2100 feet only bushes are found, especially birches, and two kinds of willow, *Salix glauca* and *Salix hastata*, but they disappear at about 2800 feet. The mosses on which the rein-deer feed extend to 800 feet below the snow-line, and to this height the Laplanders advance with their herds in summer. *Ranunculus nivalis* and similar

plants are found in the crevices of the bare rock, projecting out of the snow-masses 500 feet above the snow-line, and *Lichenes umbilicati* even 1500 feet higher in similar situations. Higher up all vegetation disappears, and no animal or bird is met with, except the *Emberiza nivalis*.

North of 68° N. lat. the mountains along the watershed of the rivers, which flow respectively into the gulf of Bothnia and into the Atlantic, sink to a much lower level, none of their summits attaining the snow-line. The highest portion of the range lies along the West Fiorden, or the long strait which divides the Lofoden Islands from the continent, and on these islands themselves. In these parts numerous mountain-masses rise above the snow-line. The Faxfield, an isolated mass (near 69° N. lat.), rises to 4260 feet; the mountains along the eastern shores of Lyngen Fiord rise almost perpendicularly above the region of snow to upwards of 4000 feet, and the glaciers descend to about one-fourth of this height. At 70° N. lat. is the Yökle Field, between Quä nanger Fiord and Alten Fiord, which rises to 3700 feet, and is covered with extensive snow-masses. It is the most northern snow-mountain of the Kiölen on the continent. In these parts all the mountain-masses are isolated, being separated from one another by deep valleys with steep sides, exactly resembling the deep sounds between the islands lying along the shores. The mountains on the Lofoden Islands are hardly inferior in height. Snow-capped summits occur in East and West Vaage, and they rise in Hindoe and some smaller islands to 3200 feet above the sea. Farther north they are less elevated, but the last snow-mountains occur on the island of Seiland, where they may be considered as a continuation of the Yökle Field, which stands opposite the island, on the continent. The islands farther north up to Mageröe, which contains North Cape, are far less elevated. This is the most dreary part of the Kiölen range. The rocks are naked and the valleys narrow. They contain little wood, and that of a small size. In a few places at the innermost recesses of the fiords some few spots occur, where potatoes are cultivated. The sea supplies the scanty population with subsistence.

The Yökle Field may, in some measure, be considered as the termination of the high range. Rocky masses of considerable elevation separate indeed the great bays, called Alten Fiord, Porsanger Fiord, Laxe Fiord, Tana Fiord, and Waranger Fiord, but they decrease in elevation as they proceed farther east. The highest portion of these rocky masses occurs at the extremity of the headlands, on the shores of the Icy Sea, but as they advance south they gradually decrease in height, until at the southern extremity of the fiords they unite in a table-land with an undulating surface, intersected by low long-backed hills of gentle ascent. This table-land descends gradually and continually towards the northern extremity of the Gulf of Bothnia; and it contains the last elevated summits of the Kiölen Mountains. The Vorio Duder, south of the innermost recess of the Porsanger Fiord, probably attains nearly 3620 feet, and Mount Rastekaise, south of the Laxe Fiord, 3200 feet. Between the Tana Elf and the lake of Enara is Mount Peldoive, an isolated height, rising to 2130 feet, but not above the region of the birch. Farther east every trace of mountains disappears. This region is somewhat more favoured by nature than that south of Yökle Field. It is true that the Porsanger Fiord and the bays east of it, being open to the northern and eastern gales, do not admit any kind of cultivation: but on the Alten Fiord, which is sheltered against these winds by the elevated islands lying before its entrance, barley and potatoes are successfully cultivated, and the birch trees attain a considerable size, though this place is in 71° N. lat. It is the most northern place on the globe in which grain is grown.

The Scandinavian range consists mostly of primitive and transition rocks: secondary rocks occur very rarely. Gneiss constitutes by far the most prevalent component of this range. Granite is not frequent; it appears, like the other primitive rocks, in some degree subordinate to gneiss. The transition formation is mostly composed of grauwacke, aluminate, clay-slate, and limestone, but it also contains sandstone and other rocks. This range is rich in metals. Iron occurs in immense layers on the eastern declivity near its extremities, in Norway, in the province of Christiansand, on the south, and, in Sweden, in Lulea Lappmark, on the north; in the latter, near the church of Gellivara, there are mountains many hundred feet high, consisting entirely of iron-ore. But the rich iron-mines of Sweden are not within

range; they are situated in the lower country which extends south-east of it. Silver occurs at Kongsberg and Iarlsberg in Norway, and at the Nasafell in Pitea Lappmark; but it is worked only in the first-mentioned place. Copper is found in the Dovre Field, at Røraas, Medal, and Selby; the mines of Røraas are productive. Lead is also found in the southern district of Norway, and at the Nasafell. Cobalt occurs in several places on the eastern declivity of the Norriska Fiellen; zinc, marble, and slate also abound in several places.

(Von Buch's *Travels through Norway and Lapland*; Elliot's *Letters from the North of Europe*; Everest's *Journey through Norway, Lapland, and part of Sweden*; Wahlenberg's *Reise auf den Sulitelma*; Schubert's *Reise durch das südliche und östliche Schweden*; Barrow's *Visit to Iceland*.)

#### NORRTELGE. [SWEDEN.]

#### NORTE, RIO DEL. [MEXICAN STATES.]

#### NORTH AMERICA. [AMERICA, NORTH.]

**NORTH AMERICAN INDIANS.** When the Europeans began to visit the coast of North America, they found that continent inhabited by a great number of nations which had made little progress in civilization, as the term is understood in Europe, and were therefore called savages. To judge from the structure of their body, they all seemed to belong to the same race. But it was afterwards discovered that in the most northern regions there were tribes which differed considerably from the rest in their physical character. These northern tribes, which belong to one nation and speak one language, are called Esquimaux, and the description which M'Keever gives of their personal appearance is inserted in the article *ESQUIMAUX*. The same author indicates the differences which exist between them and the other tribes in his description of the Crees. [*CREES*.] If we compare this latter description, and the drawings of the heads, prefixed to Chappell's 'Voyage to Newfoundland,' with the drawings, in Kotzebue's 'Voyage of Discovery,' of the inhabitants of Kotzebue Sound, it can hardly be supposed that the inhabitants of the countries round Hudson's Bay and those of the north-western extremity of North America belong to the same race. The inhabitants of Kotzebue Sound exhibit the features of the Mongol race, the broadest part of their face being somewhat below the eyes, from which point the face narrows towards the chin and towards the upper part of the head, thus producing some resemblance to a lozenge, according to an expression of Dr. Fr. Buchanan, in his description of the inhabitants of India without the Ganges. The broadest part of the face in the North Americans who live east of the Chippewyan range is in the upper part, as far down as the cheek-bones, whence the face narrows to the chin. Humboldt observes that the forehead of the Americans is considerably inclined backwards, and with it the whole facial line, while in the Mongols it approaches much more to the form of the skull of the Caucasian race. It would seem therefore that America has not been entirely peopled by any of the nations which inhabit the eastern countries of Asia, for all of them, from the Gulf of Siam to Behring's Strait, exhibit the characteristic features of the Mongol race. It is only the tribes scattered along the north-western shores that resemble those which inhabit the north-eastern coast of Asia. Kotzebue did not observe any difference between the inhabitants of Kotzebue Sound and the Tschukutskoi, except that the latter were something taller and stouter.

Besides the language of the Esquimaux, which is peculiar to that nation, the North American tribes inhabiting the country east of the Chippewyan Mountains seem to speak three principal languages, with a multiplicity of dialects peculiar to individual tribes. The most southern language is spoken by the tribes to which, since their emigration in 1837 and 1838, the countries have been assigned which lie on both sides of Red River, the Mississippi, and the Arkansas river, namely the Creeks, Chickasaws, Choctaws, Seminoles, Cherokees, and some smaller tribes. The Iroquois is spoken by the Mengwe, or six nations, in New York, the Wyandots in Ohio, Michigan, and Upper Canada, and some other tribes near Lake Michigan and Lake Superior. The Lenni-lenapé, Algonquin, or Cree language, is used by all the tribes inhabiting the country west of Hudson's Bay, and also by those who occupy the tract between Lake Superior and the Chippewyan mountains. The nomadic tribes of the desert extending along these mountains southward to the Red River of the Mississippi seem to speak the same language, which

appears also to be spoken in the countries west of the Chippewyan range and south of the Columbia river. But with respect to the languages spoken in the other parts of the north-western coast of America, our information is too scanty to enable us to form any opinion as to their connection or affinity.

When the Europeans began to settle on the eastern shores of North America, the adjacent countries were inhabited by aboriginal tribes, some of which are stated to have been very numerous. In the space of about 200 years many of these tribes have entirely disappeared, and others have left the eastern country and retreated into the interior. The destruction of these tribes is owing to the settling of the Europeans in America. It is generally supposed that it has been brought about partly by the extension of cultivation, by which the hunting-grounds of the aborigines were gradually limited, so that they could not find subsistence by the chase, and partly by the war which the settlers carried on against them. But we are inclined to think that the most efficient cause in bringing about their destruction was the use of fire-arms, by which the wars, which always exist between single tribes, were rendered much more destructive of life. The small-pox was probably not quite so destructive as the musket; yet even a few years ago several numerous tribes were much reduced by that disease, and the Mandans were nearly annihilated by it. Owing to these and other causes, the number of aborigines in the countries contiguous to the Atlantic had been so much reduced, that at the commencement of this century only a few tribes were found in the United States east of the Mississippi river, and still fewer in the British colonies of New Brunswick and Lower Canada, where they were only in possession of the rocky and elevated region which extends on both sides of the St. Lawrence river below the town of Quebec. In Labrador however and the other countries surrounding Hudson's Bay the native tribes still exist.

The number of Indians in the countries east of the Mississippi was, in recent times, comparatively small. They inhabited distinct districts, but were surrounded by a white population. The whites did not always behave towards them according to the rules of justice, and this created ill-will in the minds of the Indians. Accordingly the Indians usually joined the enemies of the republic, as appeared in 1811, when they joined the Spaniards, and in 1812, when they joined the British. The general government of the United States was well aware of the danger of having such subjects within their territories, who, in addition to what has been stated, in no way coalesced with the other inhabitants, nor was it probable they ever would. The government accordingly wished to remove them to those parts of their territories where no invasion of an enemy could be feared, to place them, if possible, where they would have no connection with the great bulk of the white population. Still no effective steps for this purpose were taken till 1834, when the state of Georgia expelled the Cherokees from its territories, and at the same time the Seminoles in Florida began to make war on their white neighbours. The executive of the general government was now empowered to remove the Indians to the west of the Mississippi river, under treaties, and to assign them territories with fixed boundaries, and at the same time to declare that it should not be lawful for whites to settle among them, except some few mechanics who would be required for agricultural purposes, especially blacksmiths, wheelwrights, and millers. The country assigned to them is situated to the west of the states of Arkansas and Missouri, and of the new territory of Iowa. The greatest part of this country consists of extensive prairies without trees or water, and is quite unfit for white settlers. But extensive bottoms occur along the rivers, which are considered quite sufficient to maintain the scanty population of Indians, when cultivated with care. It is very improbable that the United States will ever be attacked by an enemy from this side, and they have now nothing to fear from the Indians uniting with their enemies. The plan has been well executed, as the general government has acted with more than common liberality. A good price was stipulated for the cession of the tracts inhabited by the Indians, and the money was divided into three unequal parts, according to the circumstances of each tribe. One part of the money was appropriated to the liquidation of the debts which the tribes and the individuals composing them had contracted with their white neighbours; another part was appropriated to paying the expenses of their removal and those incurred in the

establishment of the new settlements; and the third was to provide an annuity until they should have ample means of procuring subsistence. Under such treaties, the Indians, who, up to the year 1836, had resided east of the Mississippi, are to be removed to the west of that river. All the tribes, except the Wyandots in Ohio, have accepted the conditions, and the greater part of them took possession of their newly-assigned territories during the years 1837 and 1838. The remainder, it is supposed, will follow in 1839 and 1840. The following table is taken from the last Report of the Commissioners of Indian Affairs, dated November 25, 1838:—

Names of the Tribes,	No. of individuals to be removed originally.	No. of individuals removed before Nov. 25, 1837.	No. of individuals removed since Nov. 25, 1837.	No. of individuals still to be removed.
Chippewas, Ottawas, and Pottawatomies	8,000	2,190	151	5,648
Pottawatomies of Indiana	1,788	404	768	150
Choctaws	18,500	15,000	177	3,323
Quapaws	476	476	..	..
Creeks	29,000	20,457	4,108	750
Florida Indians	3,765	1,079	1,851	835
Cherokees	22,000	7,911	18,000	..
Kickapoos	588	588	..	..
Delawares	826	826	..	..
Shawnees	1,279	1,272	..	..
Ottawas	420	374	..	200
Weas	325	225	..	..
Piankeshaws	162	162	..	..
Peorias and Kaskaskias	132	132	..	..
Senecas from San-lusky	251	251	..	..
Senecas and Shawnees	211	211	..	..
Ottawas and Chippewas	6,500	..	..	6,500
Winnebagoes	4,500	..	..	4,500
New York Indians	4,176	..	..	4,176
Chickasaws	5,000	..	4,600	400
	100,790	51,629	29,653	26,482

It appears from this table that the whole number of Indians who were to be removed to the countries west of the Mississippi does not much exceed 100,000, and that the removal of about four-fifths had been effected at the end of 1838. We shall now notice the countries which the principal tribes have hitherto occupied, and the territories which are assigned to them on the west of the Mississippi, and add a few observations on their present condition and progress in civilization.

The more numerous tribes which inhabited the southern states of the Union have been settled on the Red and Arkansas rivers. The Choctaws and Chickasaws, who occupied the largest portion of the state of Mississippi [MISSISSIPPI], are now established on the Red River and the country between this river and the Arkansas; the Choctaws, in the districts contiguous to the boundary line of Arkansas; and the Chickasaws, in those which lie along the frontier of Texas. The Chickasaws also occupy the south fork of the Canadian river, but a great number of the Chickasaws have settled among the Choctaws. As both tribes speak the same language and intermarry with each other, there can be no doubt that in a few years they will be one people. The Choctaws are governed by a written constitution and laws. They meet annually in their general council on the first Monday of October. The nation is divided into three districts; each district sends ten councillors, elected by the votes of the males who are twenty-one years old and upwards. They have only a representative body; the three hereditary chiefs have a veto on all measures passed by the council, which however when passed by two-thirds become a law. They have judges and officers to enforce the laws, with a jury chosen in the ordinary way. Since their settlement in their new country, the Choctaws have changed their constitution so far as to admit the Chickasaws into their council, with a chief and ten councillors, which it is supposed will greatly contribute to unite both tribes into one. Both tribes apply to agriculture with industry and skill, and raise corn, beans, pumpkins, and melons in abundance; in the southern districts they also cultivate cotton. They have extensive pasture-grounds for cattle and hogs on the prairies which extend between the two rivers. They have also several schools, and a number of missionaries are settled among them.

The Creeks, who previously to 1837 were in possession of an extensive tract in the state of Alabama [ALABAMA; CREEK INDIANS], are now settled on the northern fork of the Canadian river, where they possess extensive and

fertile bottoms for the cultivation of corn, pumpkins, beans, melons, &c., but their pasture-grounds are inferior to those of the Choctaws. A portion of them have settled on the Arkansas river. They are more inclined to labour than any other tribes, and they are good agriculturists. They are at present opposed to missionaries being sent to instruct them. They have not, like the Choctaws, formed a constitution and laws, except such as are passed by the chiefs in council. The Seminoles, or Florida Indians, are settled on the northern fork of the Canadian river, between the two tracts occupied by the Creeks. They are much behind their neighbours in civilization, and not much disposed to agricultural labour.

The Cherokees, who formerly occupied a portion of Georgia and Alabama, are now established on the bottoms of the Arkansas river, where they cultivate maize, wheat, oats, potatoes, beans, and vegetables. They are further advanced in civilization than any other Indian tribe. They are governed by written laws, enacted by the council of the nation, which meets annually in October. Judges are appointed in each district, with a sheriff to execute the laws. Trial by jury exists, and generally the laws as to property and the punishment of crimes are the same as in the United States.

The two smaller and united tribes of the Senecas and Shawnees, which formerly inhabited some tracts in Illinois, are now settled on the Neosho river, an affluent of the Arkansas from the north; and the Quapaws, who formerly lived within the state of Arkansas, have been removed to the same parts. These three tribes have not made much progress in agriculture and the arts of civilization, and are much exposed to the depredations of the Osages, a tribe which occupies the banks of the Osage river, and gains its livelihood chiefly by hunting. But as game begins to be scarce, the Osages are often in distress, and plunder their neighbours.

As most of the tribes which are dispersed through the states north of the Ohio were averse to removing to the countries on the Red and Arkansas rivers, several of them have been settled west of the state of Missouri, on the banks of the Osage and Kansas rivers and on the Missouri river itself. The four small tribes of the Weas, Piankeshaws, Peorias, and Kaskaskias, with a small number of the Ottawas, altogether not exceeding 1000 souls, occupy the tracts adjacent to the northern banks of the Osage river, and in their neighbourhood are also settled the Pottawatomies of Indiana, who somewhat exceed 1000 in number. All these tribes, through not yet entirely accustomed to agricultural labour, raise nearly as much maize, potatoes, and other articles as are required for their subsistence, and show a disposition to adopt exclusively agricultural habits. A few of them send their children to school, especially among the Peorias.

The tribes of the Shawnees, Delawares, and Kickapoos, which, taken together, compose a population of above 2500, are settled near the confluence of the Missouri and Kansas rivers, and on the bottoms contiguous to the last-mentioned stream. These nations have entirely given up the chase, and have begun to cultivate the country assigned to them with great industry; they raise maize, beans, peas, potatoes, turnips, and melons in abundance. Many of them send their children to school.

The Chippewas, Ottawas, and Pottawatomies, who were removed from the state of Michigan, are settled on the banks of the Missouri, north of its confluence with the Kansas river. But as they have not yet decidedly adopted agricultural habits, the labour of the fields is still left to the women, who cultivate potatoes, pumpkins, melons, &c.

In this way the aboriginal tribes, who have removed to the west of the Mississippi, have been distributed. The settlement of such a number of Indians in these parts must of course reduce the extent of the hunting-grounds of those tribes who inhabit these regions, and consequently their means of subsistence. This is however much less the case than may be imagined. The countries on the Red and Arkansas rivers, where the most populous tribes are settled, were nearly uninhabited, none of the wandering tribes having chosen them for their exclusive and permanent hunting-ground, on account of the want of game and the scarcity of buffaloes. They were only visited from time to time by small bands, mostly belonging to the Pawnee nation. The case is somewhat different with the tribes settled on the banks of the Missouri river and its affluents. They partly

occupy the hunting-grounds of the Osages, Pawnees, Otoes and Missourias, and Omahas; and it is probable that this circumstance will lead to some hostilities. It is hoped however that they will not be destructive or lasting, as these tribes do not depend entirely on the produce of the chase for their subsistence, but cultivate their lands, though only to a small extent.

It is the general opinion that all the aboriginal tribes of North America originally obtained their subsistence by hunting and fishing, and that agriculture was introduced among them by the Europeans. But this opinion appears to be in some degree erroneous, for most of these tribes cultivated the ground to a small extent, and raised maize, pumpkins, melons, and tobacco. This amount of agriculture was not limited to the tribes which inhabited the southern states of the Union, but extended to those in the valley of the Missouri to its great bend (near 47° N. lat.), where the Mandans and Minitaries lived in permanent villages, and cultivated maize and some vegetables even when they were first visited by the whites. The labour of the fields however was entirely left to the squaws, or women, and limited to what could be done with the hoe. The produce thus raised was insufficient for the maintenance of the families, and the deficiency was supplied by the produce of the chase. Most of the tribes bordering on the newly settled Indians are in this semi-barbarous condition, as the Osages on the Osage river, the Kanzas on the Kanzas, the Pawnees on the Platte river, the Otoes and Missourias, and the Omahas, who live in the valley of the Missouri north of its confluence with the Platte or Nebraska river, and finally the Mandans and Minitaries. The tribes which occupy the country between the Missouri and Mississippi are not more advanced in civilization; but these tribes have lately begun to use the plough, and even the male population are inclined to take part in agricultural labours.

The aboriginal tribes, which entirely subsist on the produce of the chase, and have no permanent residence, are found within the territories of the United States only along the Chippewyan mountains, and range over the extensive desert which stretches from the base of the mountains about 400 miles eastward. The number of these wandering tribes is very great, but most of them belong to two great nations, known by the names of the Sioux and Blackfeet. The several tribes of the Sioux of the Upper Missouri speak the same language, and range over the whole extent of country from the Mandan villages to the head of the rivers Platte and Arkansas. Some of their tribes occupy the country east of the Missouri, and extend eastward to St. Peter's river. The Blackfeet chiefly inhabit the mountainous country which extends around and among the different rivers by which the Missouri is formed: but they extend their hunting excursions northward to the Saskatchewan, and southward to the Platte and Arkansas rivers. As the Chippewyan mountains within the limits of the Blackfeet territory contain several depressions which present no obstruction even to the passage of wheel-carriages, the Blackfeet frequently pass to the banks of the Columbia river. Though they are all called Blackfeet, it is supposed that some of their bands speak different languages.

These barbarous nations appear to have no laws except such as grow out of usage or such as are sanctioned by common consent. The executive power seems to be vested in the chiefs and warriors, but in cases of importance, and especially when they make war or peace, the grand councils of the nations deliberate on the matter. To these councils, which are called *medicine*, or rather *magic feasts*, none are admitted but the principal men of the nation, or such as have signalled themselves by their exploits in battle, hunting, stealing horses, or in any other way that is accounted laudable by the Indians. The decision to which the council comes, of whatever nature it may be, is published to the people at large by certain members of the council, who perform the office of criers. On such occasions the criers not only proclaim the measures which have been recommended, but explain the reasons of them and zealously urge the people to support them. It is also the business of the criers, who are generally men of known courage and approved character, and are able to enforce their precepts by an appeal to their own example, to harangue the people of the village daily and to exhort them to such a course of life as is deemed praiseworthy. On such occasions, which are at the quiet time of morning or evening, the crier marches through their temporary villages, utter-

ing his exhortation in a loud voice, and endeavouring to inculcate correct principles. The young men and children of the village are directed how to demean themselves, in order to become useful and to enjoy the esteem of good men and the favour of the good spirit. They believe in the existence of a Supreme Being, whom they denominate 'Master of Life,' or 'Good Spirit,' but their ideas of his attributes are vague and confused.

The country inhabited by these tribes is frequently traversed by the citizens of the United States in their expeditions to the Columbia river. The Americans also carry on a considerable trade with the Indians themselves. The quantity of furs which they procure is small, but they obtain a great number of buffalo hides.

Passing to the British dominions in North America, we find in Lower Canada only small remnants of the once powerful tribes of the Iroquois, or Mohawk Indians, the Algonquins, and Hurons, who live in small villages, amidst the white settlers, and have adopted agricultural habits, raise maize, wheat, some other grains, potatoes, and other vegetables. The Mic-Mac Indians, who occupy the shores of the Bay of Chaleurs and the banks of the river Ristogouche, are more numerous. They live by fishing, and do not cultivate any kind of vegetables. The mountainous country north of the St. Lawrence river, on both sides of the Saguenay river, the shores of St. John's Lake, and the interior of Labrador, are occupied by the tribes of a nation which is called Montagnais, or Mountain Indians, who wander about in that extensive region without any fixed residences, and live by hunting and fishing.

The tribes which still occupy a great portion of Upper Canada are more numerous. A large part of the country between the river Ottawa and Lake Huron is still in their possession. The principal nations in this tract are the Ottawas and Chippewas, who live in the countries which surround Georgian Bay on the south, and on the Manitoulin Islands, and are allied with the tribes known by the same name and occupying the north-western part of the state of Michigan, and the Missisqua Indians, who occupy the eastern shores of the Georgian Bay. All these tribes live by hunting, and possess a country rich in game and furbearing animals. The shores of Lake Superior, as well in Upper Canada as in the United States, are inhabited by the Ojibwas, who seem to be only a branch of the nation called the Crees, or Knistinaux, which extends farther north to the shores of Hudson's Bay and the Mississippior Churchill river. These nations are hunters. The country on both sides of the boundary-line between the United States and the British possessions, and extending from Lake Superior to the Chippewyan mountains, is in possession of two nations, the Chippewas and Assinaboins. The Chippewas, who occupy the eastern districts as far west as the Red River of Lake Winnipeg, inhabit a rocky country almost entirely destitute of game, and live partly by fishing and partly by collecting the wild rice which covers most of the lakes and swamps with which this country abounds. The Assinaboins, who live west of the North Red River, are considered as a branch of the Sioux, and visit the plains south of the Saskatchewan river in quest of buffaloes, which form their subsistence.

Neither the Assinaboins nor the Crees extend their wanderings to the base of the Chippewyan mountains, the former being divided from them by some tribes of the Blackfeet, and the latter by the Assceneepoytuk, or Stone Indians. The last-mentioned tribe hunts on the extensive plains between the forks of the Saskatchewan river. The Crees extend their excursions northward to the banks of Athabasca Lake. North of this lake and along the shores of Slave and Mackenzie rivers are the Beaver Indians, the Hare Indians, and the Louchen Indians, and in the countries east of the river the Copper and Dogrib Indians. The three last-mentioned tribes are separated from the Icy Sea by the Esquimaux, who occupy the shores of that sea. All these tribes live principally by hunting, but they also fish in the extensive lakes which cover a great portion of their country.

Our information respecting the aboriginal tribes which inhabit the countries west of the Chippewyan range is too scanty to enable us to give even a list of them. The most powerful tribes on the banks of the Columbia river, the only portion of the north-west coast of America which is tolerably well known, are the Snake Indians, or Shoshonees, and the Flatheads. The Shoshonees occupy the countries



on the southern and the Flatheads those on the northern branches of the Columbia river.

(Long's *Expedition to the Rocky Mountains*, by James; Long's *Expedition to the Sources of St. Peter's River*, by Keating; Franklin's *First and Second Journey to the Shores of the Polar Sea*; Irving's *Astoria*; McKeever's *Voyage to Hudson's Bay*; Kotzebue's *Voyage round the World*; Bouchette's *Topographical Dictionary of Lower Canada*; *Annual Report of the Commissioner of Indian Affairs*, Washington, 1838.)

NORTH CAPE. [TRONDHIEM.]

NORTH KYN CAPE. [TRONDHIEM.]

NORTH SEA. The *German Ocean*, though touching out a small portion of modern Germany, and though more commonly called the North Sea, still maintains its ancient name, derived from Oceanus Germanicus. (Ptolemy, *Geogr.*, lib. ii., cap. 3.) It is separated from the Atlantic by the British Islands, which form its western limits, and on the opposite side by Norway and Denmark from the Baltic. To the southward it is bounded by the coasts of France, Belgium, the Netherlands, and Germany; and to the northward an open space between the Shetland Isles and the Norwegian province of Bergen unites it to the Polar Sea. With the Atlantic it is connected through the Strait of Dover by the English Channel; and with the Baltic by the broad gulf called the Skagerrack, which, turning to the southward round the peninsula of Jutland, there takes the name of the Kattegat; and then divides into the three navigable but narrow passages called the Sound, the Great Belt, and the Little Belt. It extends across ten degrees of latitude and eleven of longitude; its greatest length may therefore be taken at 600 geographical miles, its extreme breadth at 350, and its superficies at about 140,000 square miles.

On its north-eastern side the bold rocky face of Norway, intersected by deep fiords, rises precipitously from its bosom; but the sea here receives few tributary streams from the interior mountains, and it preserves a depth of many hundred feet along the base of the cliffs. Its south-eastern and southern coasts are low; the Elbe, the Weser, the Rhine, and the Schelde pour out through those alluvial shores enormous quantities of sand, which have more or less filled up the southern portion of the basin. This sand, as it subsides through the water, is swept by the alternate flood and ebb into long sinuous and shallow banks, which, rising in narrow ridges towards the surface, place themselves in directions parallel to the contiguous shores, or rather in lines radiating from the Strait of Dover, through which the North Sea tides enter and return. The east coast of England partakes of the same character, and is exposed to the same effects; the Thames, the Ouse, the Humber, the Tyne, the Forth, and the Tay, contributing their unceasing though comparatively trifling efforts to front the shore with similar shoals. All these shoals and banks obstruct the free navigation of the sea, and, combined with the stormy and foggy character of the climate, have led to the destruction of an immense number of vessels. There are other banks, which do not seem to be attached to the shores or to assume the same ridge-like form, but which have been equally the result of the same causes; for however weak may be the impulse of the rivers at such a remote distance from the shore, or however slow the transporting power of the tides, yet, when multiplied by the action of successive ages, they will sufficiently account for the deposit of all these submarine accumulations. Such are the long North Bank, the Dogger Bank, the Well Bank, the Broad Fourteens, and others which need not be enumerated. No accurate representation of any of these banks has ever yet been made: the best charts have merely consisted of the patch-work improvements of consecutive corrections, or of the reports of pilots who were without the means of giving precision to their discoveries; and it is therefore with great satisfaction that we find Great Britain at length taking up this important desideratum, and employing an active and skilful naval officer in a thorough investigation of the whole sea. Beginning to the southward, where he has received every facility from the Dutch and Belgian governments, and advancing regularly by zones, he will be able to produce a complete map of the singularly undulating surface of the bottom, noting every variety of sand, gravel, or shells, along with their characteristic tints. This survey will be as valuable to the mariner, whose existence depends on a correct knowledge of the varying depth be-

neath his keel, as it will be interesting to the philosopher who contemplates the gradual operations of nature. The deep holes which are found in this sea form another of its singular features. There are several of these holes, but it will be enough for our purpose to particularise the 'Little Silver Pit' off the coast of Holderness in Yorkshire. The northern end of this singular hole is in 53° 45' N. lat., 0° 47' E. long., from whence it runs in rather an irregular form and nearly on the true meridian to 53° 20' N. lat., 0° 43' E. long., a length of 25 miles. Its breadth at the northern end is little more than half a mile, but towards the middle it is two miles, whence it narrows to one mile and a quarter, and again increases to two miles in breadth towards the southern end. The Little Silver Pit, so called in contradistinction to the Great Silver Pit (which is an extensive space of comparatively deep rocks between the Dogger and Well banks) is situated seven leagues eastward of the entrance of the river Humber. The depth of the water on its edges varies from 50 to 80 feet, and yet, in this singular submarine ravine there is a depth of 330 feet, in 53° 31½' N. lat., 0° 41½' E. long., the deepest part of this hole yet discovered. But the most surprising feature of the Little Silver Pit consists in the great steepness of its sides, and it would appear somewhat extraordinary, taking into consideration the sandy, gravelly, and loose nature of the surrounding ground, together with the action of the tides, which run at the springs with a velocity of more than three miles an hour in a diagonal direction across it, that the hole is not in course of gradual filling up. But on the other hand, when we further consider that in most of its parts we find a bottom of mud and clay, we have a strong proof that the surrounding materials are not in any great degree washed down into it, and are therefore compelled to acknowledge that an air of mystery belongs to its character, still remaining to be explained away. The Little Silver Pit is marked in charts of very ancient date, another proof that it is kept open from some great and unknown cause. It is the resort of fish of various kinds peculiar to the North Sea as ground-fish, and soles of unusually large dimensions have recently been taken from it, but it is a place very dangerous to trowing-nets by reason of its narrowness, the perpendicularity of its sides, and the diagonal set of the tides, rendering it extremely difficult to drag nets fairly along its bottom. The North-north-east hole, so called from its position with respect to Cromer, is another of these remarkable places, and characterised nearly as the other is; it is situated eight leagues to the eastward of the Little Silver Pit; its greatest depth yet discovered does not however exceed 265 feet.

One island only interrupts the uniformity of this sea, Helgoland Rock, which lies off the mouth of the Elbe, unless the Bell Rock and the May Rock, situated in the opening of the Frith of Forth, may be so called: on each of these three insulated spots lighthouses have been erected. Lighthouses have likewise been established on all the salient points of the coast, as well as at the entrance of all the principal ports; and floating-light vessels have also been moored on several of the detached banks. Between Dover and the Shetlands 56 lights may be reckoned, and on the opposite continent 25 succeed each other from that on Cape Grinez in the Strait of Dover to the entrance of Bergen. Multitudes of buoys and beacons have also been placed on the sand-banks, wherever the swell of the sea would admit of their being secured, in order to mark the proper channels, but no pains or expense can be too great to ensure the safety of the skilful and hardy seamen who traverse this sea, or to facilitate the extensive traffic which it is the means of supporting between the active and industrious nations that inhabit its shores. It carries the great staple commodities of the northern regions of Europe, their coals, the timber of their inexhaustible forests, their hemp, and their hides and tallow, and bears back in return the manufactures, the necessaries, and the luxuries of more favoured climates. It is the marine highway to the capitals of eight different states, and it may be asserted that no sea in the world of equal dimensions can boast of half such a commercial intercourse, either in the number of vessels which it employs or in the general value of their cargoes.

The profusion of fish in the German Ocean has in all ages been celebrated, and the protection of its fisheries has given rise to more than one national quarrel. The skill and enduring perseverance of the hardy Dutch and British fishermen who frequent this turbulent sea is proverbial: at all times of the year they brave its inclemencies.

in pursuit of the fish which are in season. The principal of these are cod, hake, and ling, with turbot, soles, and other flat fish, and especially the vast swarms of mackerel and herrings which at certain periods visit our shores, and which give active employment to thousands of men, women, and children. The lobsters found on our own rocky coasts are not sufficient to supply the demand, and the London market alone employs five or six vessels constantly plying between this country and Norway, which seems to be their favourite habitation. When brought over, they are deposited in large wooden cases, properly perforated, and secured in a creek called Hole-Haven, on the Essex side of the Thames, near the upper part of Sea Reach, from whence they are transmitted to Billingsgate according to the consumption.

To trace the course of the tides in the German Ocean would require a long article, so various are the phenomena, and so incongruous do they at first sight appear; the flood running to the northward along one part of our coast and to the southward in another; rising upwards of 20 feet in some of its æstuaries, and elsewhere being scarcely perceptible; and though everywhere regulated by the phases of the moon, yet showing high-water in one place at the same moment that it is low-water in another. A few words will explain the general principle of these apparent irregularities. The great tidal wave which rolls up from the Atlantic Ocean splits at the south-west angle of Ireland into two streams, one of which pursues its straight course up the English Channel, though somewhat retarded in its progress by the converging shores; while the other passes to the northward, and bending round the north of Ireland and Scotland, pours through the Pentland Frith with a velocity of seven or eight miles per hour, or, sweeping round the Orkneys and Shetlands, turns to the southward along the coast of Great Britain, but spreading as it goes across the whole expanse of the German Ocean. This circuitous course requires more time for the transmission of the northern wave than that which arrives through the Strait of Dover, and therefore when the two flood-tides meet, which takes place off the coast of Essex, the northern is half a day later than the other branch from which it was originally separated. On the coast of Holland this meeting occurs not far from the Texel, but in the widening interval between those two shores these opposite streams seem to neutralise each other, so as to produce neither rise nor fall. Besides the action of the lunar tides, the effects of distant currents are sometimes manifest in the northern part of this sea, produced by the melting of the polar ice, and, in an opposite direction, by the continuous movement of an offset from the Gulf Stream of America.

The icebergs which quit the arctic seas and melt in the vicinity of the German Ocean, the overflowing of the Baltic Sea, and the volume of fresh water constantly pouring into its confined space from the surrounding rivers, sufficiently prove, whatever may have been asserted to the contrary, that its water must contain considerably less salt than that of the Atlantic.

**NORTH-WEST PASSAGE.** If a vessel by sailing from the western shores of Europe in a north-west direction were to enter the Pacific, it would be said to have made the North-West Passage. The first attempts to accomplish such a voyage are nearly coeval with the discovery of America. These attempts have been frequently renewed, but it is still doubtful if such a voyage can be accomplished.

A few years after the discovery of America, Vasco de Gama succeeded in reaching the shores of Malabar in Hindustan. He returned to Europe in 1499. On comparing the geographical position of the countries discovered by Columbus and Vasco de Gama, it was evident that an immense space lay between them. This space comprised the great kingdom of Cathay (China), which on the globes and maps made by the German geographers of that time, on the authority of Marco Polo (who however had not determined the geographical position of any place which he visited), extends more than twenty degrees east of its true position. It was therefore concluded in Portugal, that Vasco de Gama had only sailed half way to Cathay, and that the countries discovered by Columbus were much nearer to Cathay than the coast of Malabar was. It was supposed, that if a vessel were to sail past the countries discovered by Columbus, either to the north or the south, it would reach Cathay. This consideration gave rise to the first attempt to make a

North-West Passage, which was viewed as of such importance, that the attempt was made before the second Portuguese fleet, under the command of Cabral, was despatched to the East Indies. In 1500, Gaspar de Cortereal, a distinguished nobleman, was sent out to make the North-West Passage. He discovered a large part of the north-eastern coast of Labrador, and, as it is said, to the extent of 600 or 700 miles. The following year he returned to the place to which his discoveries had extended, and came to a strait, which was called the Strait of Anian, after the name of one of the officers. It can hardly be doubted that this is the strait which is now called Hudson's Strait. Being entangled in the floating ice which encumbers that strait all the year round, his vessels were separated. The vessel of Gaspar de Cortereal was never heard of, but the two others returned to Lisbon. A brother of Cortereal sailed in 1502 in search of him, but he also never returned. After these disasters the Portuguese abandoned the attempt.

John Cabot had previously (1497) discovered the island of Newfoundland, but evidently without any design of discovering a North-West Passage. His son Sebastian Cabot, who had accompanied him on his voyages, sought for the passage in 1517, when he accompanied Sir Thomas Pert, but this voyage added nothing to what had been done before. For a long time no attempt was made, probably because Magalhaens had succeeded in entering the Pacific at the southern extremity of America by the strait which bears his name.

The spirit of maritime discovery was excited in England about the middle of the sixteenth century, and lasted more than fifty years. All the numerous attempts made in this eventful period were at the expense of private persons, or rather at the expense of companies of merchants. The attempts were first directed to the discovery of a North-East Passage, by which it was proposed to reach the Pacific by sailing from west to east along the northern shores of Asia. The real extent of the continent of Asia was then unknown. Three vessels sailed under the command of Sir Hugh Willoughby and Richard Chancellor in 1553, for the sea which washes the northern coast of Europe. The vessels separated: Sir Hugh perished with his whole crew on the coast of Lapland, and Chancellor entered the White Sea. Chancellor's discovery was of importance: it led to the establishment of a trade between England and Archangel, and to the design of the English of carrying on commerce with India by means of the Volga and the Caspian Sea. This enterprise of trading with India through the Volga so completely engrossed the attention of the merchants of London, that all further attempts at discovering the North-East Passage were abandoned. Towards the end of the sixteenth century the Dutch commenced their enterprises in this direction, for which they had a strong motive. Having risen in arms against Philip II., king of Spain, who was then also king of Portugal, their vessels were excluded from the ports of America and of the East Indies then in possession of those nations. In their voyage to such parts of the East Indies as did not belong to the Portuguese, and on their return home, they had to traverse a large extent of sea, of which the Spaniards then claimed the dominion, and in which their merchant vessels were in danger of being taken. The Dutch merchants accordingly resolved to try if it was possible to reach the East Indies by a North-East Passage. William Barentz made two voyages (1594-1596), but was unable to proceed east of Nova Zembla and the Strait of Waygat, on account of the quantity of ice which always covers the sea to the east of that island. Since his last voyage, in which he passed the winter on Nova Zembla, the North-East Passage has been given up as impracticable.

In the meantime the North-West Passage was lost sight of until the year 1576, when the attempt was again made by the English, who prosecuted this object with great ardour for forty years. All that has been effected towards discovering the North-West Passage is due to the English. The first English seaman who did anything decisive towards this object was Martin Frobisher, who made three voyages (1576, 1577, and 1578) to the northern seas. In the second voyage he discovered Frobisher's Strait (63° N. lat.), and in the third he re-discovered the Strait of Anian, or Hudson's Strait. He was followed by John Davis, who likewise made three voyages (1585, 1586, and 1587). In the first voyage he discovered Davis's Strait between Greenland and Cumberland Islands, sailed up to Mount Raleigh (66° N. lat.), and afterwards found the inlet, now called

Cumberland Strait (65° N. lat.). In his third voyage he extended his discoveries along the western shores of Greenland as far north as Sanderson's Hepe (72° N. lat.), and in sailing southward he likewise found the entrance of Hudson's Strait, which had been seen before that time by Corter and Frohisher, but none of these three navigators seem to have advanced any great distance into it. [Davis.] Henry Hudson, after several unsuccessful voyages of discovery to the north-east and north, directed his last voyage to the north-west, and penetrated through the strait into the bay, both of which are now called by his name. He passed the winter on the shores of the bay, hoping to find a passage to the Pacific in the following year, but his crew, which had suffered great hardships during this voyage, mutinied, and abandoned him and some of his adherents in a boat in the middle of the bay. Hudson was never heard of afterwards. [Hudson.] In the two following years some parts of Hudson's Bay were explored. In 1612 Sir Thomas Button discovered Roe's Welcome, the strait between Southampton Island and the continent; and Bylot in 1613 discovered Fox Channel between Cumberland Island and Southampton Island. Bylot and Baffin in 1614 penetrated through Davis's Strait and explored Baffin's Bay to its most northern extremity, called Sir Thomas Smith's Sound (78° N. lat.). In returning along the western shores of Baffin's Bay, they passed the wide opening of Lancaster Sound (between 73° and 75° N. lat.), but considered it a closed bay. As their researches had been made with great care, Baffin was of opinion that all attempts to find a North-West Passage in these parts were useless, and this opinion soon became so prevalent as to put a stop to all voyages of discovery in this direction. The voyages were now directed only to the exploration of Hudson's Bay, and were prosecuted with less ardour. In 1631 James discovered James's Bay, the most southern part of Hudson's Bay, and Fox again examined the two straits which enclose the island of Southampton, Roe's Welcome, and Fox Channel. More than a hundred years later, in 1741, Middleton explored Wager River and Repulse Bay, to the west of Roe's Welcome, and found that both were closed inlets.

While the English were pursuing their discoveries on the north-eastern shores of North America nearly without interruption, the Spaniards made some feeble attempts along the north-western coast with the view of finding a North-West Passage. Their voyages led to no important result, except that two of their navigators pretended that they had discovered the passage. Juan de Fuca is said to have entered a large bay between 47° and 48° N. lat., and to have sailed through a strait in a north-eastern direction until he reached the Atlantic Ocean. He sailed from Acapulco in Mexico, and returned to that place. Admiral de Fonte is said to have entered, in 1640, a broad navigable inlet, situated in 53° N. lat., which led him to an inland lake of great dimensions, and thence to the Atlantic. The short accounts which exist of these voyages were not printed in England till a long time after their pretended performance, and it must be observed that the Spanish government never admitted that the voyages had taken place; a fact which at that time was attributed to the jealousy which prompted the Spaniards to exclude all foreigners from their possessions in America. Humboldt, in his work on Mexico, says, that after the most careful researches in the archives of Mexico, he was unable to find any document in which Juan de Fuca or the Admiral Bartolomeo de Fonte was even mentioned. The accounts of the voyages, attributed to these navigators, are evidently fabrications, invented for the purpose of appropriating to the Spanish nation the honour of the discovery, if such a passage should ever be found. Juan de Fuca had certainly visited the north-western coast of America; the southern strait by which the island of Quadra and Vancouver is separated from the continent still bears his name.

When the distinguished navigator Cook entered on his last voyage of discovery, he was instructed to try how far he could advance northward between Asia and America. He reached Icy Cape (70° N. lat.), where he found that a barrier of ice extended from one continent to the other. In the same voyage he visited several parts on the western coast of North America, and found that on the western side too the rocky shores were indented by numerous inlets. The nearly forgotten fabrication of Juan de Fuca was again discussed, and the English as well as the Spaniards soon after sent several expeditions to survey these coasts. After a close examination of the whole coast north of 45° N. lat., it

was ascertained that it consisted mostly of islands, separated from the continent by narrow sounds, and that the numerous inlets by which the continent itself is indented do not extend far inland, and terminate at the foot of elevated mountain-ranges.

The question as to the existence of a North-West Passage now seemed to be decided in the negative, when the whalers who annually visit the sea on both sides of Greenland reported that in the years 1816 and 1817 the arctic seas were much less encumbered with ice than had ever been observed. The British government now resolved to make an attempt to settle this question. In 1818 two vessels were despatched, under the command of Captain John Ross and Lieutenant Parry, to re-examine the shores of Baffin's Bay. All the bays and inlets which these navigators entered were closed by mountains or ice, and Captain Ross was also of opinion that this was the case with Lancaster Sound (between 73° and 75° N. lat.), and that a North-West Passage did not exist in these quarters. But Parry thought that the last-mentioned inlet had not been examined with sufficient care, considering its great width. Parry was sent in the following year (1819), for the purpose of examining Lancaster Sound more closely than had been done by Captain Ross. On entering the sound he sailed in a westerly direction 30 degrees of longitude, or 540 miles, having on the north a series of elevated tracts, broken apparently into islands by intervening channels. These channels were not examined, and may perhaps turn out to be only bays. The larger of these islands were named by him respectively Cornwallis, Bathurst, and Melville Island. On the south side of the sound were two large islands, of which the eastern was called Cockburn Island; the western remained nameless, as it was supposed to form a part of the American continent. The channel which divides these two islands received the name of Regent's Inlet. West of 100° W. long. no land was in view on the south. Parry and his crews passed the winter on Melville Island, hoping in the following summer to reach the Pacific. He was unable however to advance west of Melville Island, the sea being covered with thick and impenetrable ice; but no land was in sight, except that at a great distance to the west-south-west there appeared a bold coast, which was named Banks's Land. It was now clear that it was only owing to the series of islands which skirt the northern shores of this long strait that they had been enabled to proceed so far westward, and that the sea ceased to be navigable where these islands terminated.

All hope of reaching the Pacific by Lancaster Sound being frustrated, Parry proposed to try if the object could be effected by any of the inlets which open into Hudson's Bay, the northern portion of which had not been explored. In 1821 he entered that bay, and passing between Cumberland Island and Southampton Island, he advanced to Repulse Bay, which he examined and found to be completely enclosed, as Middleton had described it. He then explored a part of the contiguous coast to the northward, in which he found another large indentation, which he called Lyon's Inlet. His vessels were soon afterwards frozen up in the midst of the sea, near Winter Island (65° N. lat.). In the following summer he continued his voyage northward, and discovered the whole coast between 65° and 70° N. lat., in which no deep indentation occurred, with the exception of a wide sound between 69° and 70°, which he explored for more than 60 miles, when he found that it was closed by a barrier of ice, lying south and north across the strait, but he ascertained that beyond this barrier there was an open sea, a circumstance which agreed with the information that he had obtained from the natives. This opening therefore was not a bay, but a strait, which he called, after the two vessels under his command, Fury and Hecla Strait. At the time of this discovery the season was far advanced, but he hoped to be able to reach the open sea west of the strait the following summer, and accordingly he passed the second winter on the island of Igloodik, at the eastern extremity of the strait. But though he waited to the middle of August in the following year, the strait continued to be covered with ice, and he was obliged to give up all hope of effecting his purpose.

The result of this attempt showed that Fury and Hecla Strait did not allow a navigable North-West Passage. Parry, whose success had deservedly secured the confidence of government, again obtained the same vessels for the purpose of trying whether Regent's Inlet, which, according



information obtained from the Esquimaux, stretches far to the south, might not allow a passage. On arriving at the entrance of Regent's Inlet, he found it much encumbered with ice, and was obliged to pass the winter from 1824 to 1825 in Port Bowen, on the western coast of Cockburn Island. In trying to sail southward the following July, one of the vessels (the *Fury*) was lost in the ice, and Parry returned home in the *Hecla*. Government did not think fit to continue these voyages, which led to no definite result; but as the last attempt of Parry had been merely interrupted by an accident, it seemed still probable that a navigable North-West Passage might exist through Regent's Inlet. A wealthy individual, Sir Felix Booth, furnished all the expenses for a new adventure, the direction of which was given to Captain John Ross, who, after passing through Lancaster Sound, entered Regent's Inlet in 1829, and sailed along the western shores of the inlet as far south as Felix Harbour (70° N. lat.), where he passed the winter. The following seasons were unfavourable, the sea being constantly encumbered with heavy ice, and he was obliged to remain nearly on the same spot two more winters. This circumstance gave him an opportunity of examining the adjacent countries, and he found that the country west of Regent's Inlet was not an island, but joined to the continent of America by a low isthmus of inconsiderable length and width. It is however supposed that a strait actually exists in this part, which escaped his research. The peninsula which Ross considered to be united by the low isthmus to the continent of America was called by him Boothia Felix. The shores of the continent itself, west of the isthmus, were examined to a distance of 70 miles, and the most western cape which was reached was called Victory Point (69° 46' N. lat. and 98° 33' W. long.). In another excursion the Magnetic Pole was found to be in 70° 5' N. lat. and 96° 46' 45" W. long. Not being able to extricate his vessels from the ice, Captain Ross and his crew returned in 1832 in boats to Hudson's Bay, where they were received on board of a whaler.

The only North-West Passage the existence of which is certain, is the long strait which is connected with Baffin's Bay by Lancaster Sound. This strait ought, in conformity with the precedent of Magalhaens, to be called Parry's Strait. Since however its western extremity is always blocked up with ice, it never can be available for the purposes of navigation. Still it is not improbable, as already mentioned, that another strait divides Boothia Felix from the continent of America. This hitherto unknown strait has lately attracted a great deal of interest, as being connected with the northern termination of the American continent. The whole line of coast between Behring's Strait and the mouth of the Mackenzie river is now known. Between the discoveries of Captain Beechey, who advanced to Point Barrow (71° 28' N. lat. and 156° 10' W. long.), and those of Sir John Franklin, who went as far as Point Beechey (70° 30' N. lat. and 150° W. long.), only a coast-line of about 130 miles remained undiscovered, and this tract was explored, in 1837, by Messrs. Dease and Simpson, agents of the Hudson's Bay Company. (*London Geo. Journ.*, vol. viii.) East of the Mackenzie river the coast-line as far as Point Turnagain (near 109° W. long. and 68° 30' N. lat.) was discovered by Sir John Franklin and Doctor Richardson, and the distance between this cape and the Point Victory of Captain Ross does not much exceed 300 miles. Dease and Simpson advanced to 106° W. long. in 1838 (*London Geographical Journal*, vol. ix.), so that the whole distance now unexplored does not much exceed 200 miles. Captain Back, in his expedition in search of Captain Ross, found a sea between 67° and 68° 30' N. lat. and 95° and 97° W. long. Back observed a pretty strong current setting eastward, which is the strongest argument for presuming that a strait exists in these parts, probably to the south of Point Victory. If the Hudson's Bay Company continue to encourage their agents, in a few years more we shall be acquainted with the whole extent of the American continent towards the north, and the question respecting the North-West Passage will be finally settled.

It is evident that the great advantages which were once expected to accrue from the discovery of a North-West Passage, can never be realised, and it is even doubtful whether such a passage will be of any use at all. Even if the yet undiscovered portion of it should be navigable, that portion which we already know is totally unfit for navigation during the whole year. Between the mouth of

the river Mackenzie and Barrow Point, the most north-western cape of America, the sea, even in August and September, is so encumbered with ice, that in some parts it is impossible to advance in large boats. It is certain that a trading vessel will never find its way through that frozen sea. Still we are inclined to attach some importance to the discovery of that passage, not only as a geographical question but also in a practical point of view, simply because we can never form a just idea of the usefulness of anything before it is known.

(Barrow's *Chronological History of Voyages into the Arctic Regions*; *Voyages of Ross and Parry*; Franklin's *Expeditions to the Polar Regions*; *London Geogr. Journal*, vols. v., viii., and ix.)

**NORTH-WESTERN TERRITORY** is a term frequently used to designate a part of the territory which lies to the west of the Chippewyan or Rocky Mountains, in North America. No general name has yet been given to the countries, which extend along the Pacific, from Cape Mendocino (near 40° N. lat.) to Behring's Strait (north of 65° N. lat.) and the Icy Sea, and occupy the space between the Pacific and the Chippewyan Mountains. We shall however give a short description of these countries under this head.

The Chippewyan or Rocky Mountains run from the mountain-knot of the Sierra Verde (between 40° and 42° N. lat.), in a general north-north-western direction, through twenty-five degrees of longitude (from 110° to 135° W. long.) until they terminate at the mouth of the Mackenzie river (68° N. lat.). The most eastern range of this extensive mountain-system constitutes the eastern boundary of the region in question. The shores of the Pacific, which bound it on the west, run (between 40° and 45° N. lat.) nearly due north, and gradually approach the mountains. The distance between them may on an average be estimated at 670 miles, until they reach the Sound of Juan de Fuca (47° N. lat.), where they are only about 400 miles distant. From this sound the coast trends north-north-west, and runs parallel to the Chippewyan Mountains to Behring's Bay 68° N. lat.), preserving a distance of about 380 miles from them. From Behring's Bay the coast-line turns westward, and runs in that direction more than 700 miles. This latter coast is parallel to the coast-line of the Icy Sea, which is ten degrees farther north, and thus the north-western extremity of North America forms an extensive peninsula, nearly 30 miles in width and more than 700 long, which terminates on the west in projecting headlands on the shores of the Kamtchatka Sea, Behring's Strait, and the Icy Sea.

According to a rough estimate, the area of this region is above 1,000,000 square miles, which are thus distributed:—The southern region (between 40° and 47° N. lat.) is on an average 670 miles wide from east to west, and about 481 miles long; the area is 300,000 square miles. The central region (between 47° and 60° N. lat.) is about 900 miles long and 380 miles wide: the area is 300,000 square miles. The northern peninsula measures 700 miles from south to north, and more than 700 miles from east to west: the area is 500,000 square miles. The total area is 1,100,000 square miles, which is equal to the basin of the Mississippi river.

Cape Mendocino, which may be considered the most southern extremity of the *Southern Region*, rises from the sea with a steep ascent to a great elevation. It consists of bare rocks, furrowed by deep clefts and narrow valleys, which are the only portions of this mountain-mass that are wooded. The coast north and south of this cape to a distance of several miles has the same character, though it is not quite so high. It is supposed that Cape Mendocino is the western extremity of an elevated mountain-range which runs eastward to the Chippewyan range, and joins it at the mountain-knot of the Sierra Verde. This supposition is founded on the information that this tract contains the watershed between the numerous tributaries of the Columbia river, and the Rio S. Sacramento or Buonaventura, which falls into the Bay of S. Francisco [CALIFORNIA], and the Rio Colorado [MEXICAN STATES]. Another range runs northward from this transverse chain, about 150 miles from the sea, to the Columbia river: it attains a considerable height, and about 50 miles from the banks of that river rises in Mount Hood to the height of about 15,900 feet. This range approaches close to the river, and produces the rapids and waterfalls which are called the Long Narrows. The mountain-chain is continued north of the river to the Sound

of Juan de Fuca, where one of its summits, Mount St. Helen's, is 14,400 feet high. This range divides the more fertile portion of the southern region from that which is sterile. The country west of the range is in general covered with trees. Along the western declivity of this range is the Columbia valley, which is 60 miles wide towards the north, and extends far to the south: its southern districts have not been explored. It is a country of great beauty: the surface is intersected with numerous small lakes and pools, and exhibits great luxuriance in its extensive meadows and fine forests. The river Wallamot, or Wallamette, runs through this valley. A range of high hills runs on the west of the valley, and from this range to the shores of the Pacific there is a mountainous country, but it is in general covered with dense forests of hemlock, spruce, white and red cedar, cotton-wood, white oak, and some other kinds of trees. These forests extend to the shores of the sea, which are rocky and precipitous, and generally bare. This mountainous country approaches the Columbia river on the south, about 70 miles from its mouth, and compels it to change its western into a north-western course. The banks of the river where the mountains border it are often high and rocky, with low marshy islands at the base of the banks, which are subject to inundation, and covered with willows, poplars, and other trees. In other places the mountains recede from the river, leaving between their base and the stream beautiful plains, which are covered with tall trees. These lower tracts and the declivities of the adjacent mountains are overgrown with deciduous trees; but the more elevated part of the uplands is covered with majestic pines and firs, some of which tower to the height of between 200 and 300 feet. Where the Columbia valley opens on the Columbia river, the banks are occasionally marshy, and covered with so dense a growth of shrubs and rushes as to be almost impassable. Where the elevated range of Mount Hood comes up to the river, the banks consist of stupenduous precipices covered with fir and white cedar.

East of the range which contains Mount Hood the country is an inclined plain, rising gradually towards the east, south-east, and north-east, until it joins the base of the Chippewyan Mountains. This tract, which is about 150 miles wide, is an uneven plain, on which level tracts of great extent alternate with ridges of moderate elevation. The soil of the level grounds consists chiefly of gravel and sand, interspersed with bare rocks. These plains are nearly as destitute of vegetation as the country along the eastern base of the Chippewyan Mountains. The hills extend in ridges running south and north, and generally consist of an indurated clay: they exhibit few signs of vegetation, and are very rarely covered with forests, except on the more elevated parts, where they are clothed with scrub pines and cedars, aspens, a small kind of cotton-tree, and some shrubs.

The Chippewyan Mountains, which lie to the east of this desolate region, seem to consist principally of two elevated ranges running parallel to one another at a distance of less than 100 miles: in several places they are united with one another by short transverse ridges. In some places the eastern range rises to the snow-line. There occur in it several depressions, where the upper branches of the Missouri and Columbia approach near one another, and some few of them present no obstacle to the passage of wheel-carriages. The western range does not appear to rise so high, and in several places contains depressions, which allow a passage for the waters that collect from both ranges, and constitute the principal branches of the Columbia river. Not far from the source of the Snake river, in this range, there are three high summits, called the Three Breasts, or Tétens, which stand on a common base, which is perforated by deep caverns, by which several small rivers pass under the mountains southward, and join the Snake river. The mountains of the Chippewyan range are generally barren; but the intervening valleys contain several fertile tracts, which are partly covered with high trees and partly with fine grass.

The country enclosed by the two ranges of the Chippewyan Mountains must have a great elevation, which is proved by the circumstance of the great rapidity of all the rivers which join the principal branches and tributaries of the Columbia river. Their course is in general a succession of rapids and cataracts, which sometimes continue without interruption for 50, 80, or even 100 miles. The navigable parts of these rivers are of less extent than those which are

quite unfit for navigation. The Long Narrows occur in the Columbia river about 180 miles from its mouth, and occupy 80 miles of its course. They begin with a perpendicular cascade of 20 feet, after which there is a rapid descent for a mile between islands of hard black rocks to another fall of 8 feet, which is divided by two rocks. About 2½ miles below this fall the river expands into a broad basin, from which the water escapes by a chasm only 45 yards wide. Through this narrow passage the whole body of the river swells and boils for some distance in the wildest confusion. Lower down there are several rapids, and the river is again compressed into a channel from 50 to 100 feet wide, which is worn through a rough bed of hard black rock, along which it rushes with great fury, and from which it escapes by the second great fall, over a ledge of rocks 20 feet high, and extending nearly from shore to shore. The river is navigable for large barges up to the Long Narrows, there being no impediment farther down. At Vancouver Fort, more than 100 miles from its mouth, the tide is still perceptible, and vessels of between 200 and 300 tons can ascend to this point.

A country which rises with a steep ascent from the sea more than three thousand feet in a distance of about 300 miles, and of which about one-half is exposed to the influence of the Pacific, must have great differences of climate. We are only imperfectly acquainted with the climate along the coast; but we know that it resembles the western countries of Europe rather than those parts of the United States which are on the Atlantic. The winters are not rigorous nor the summers sultry. There is little snow, and it generally melts while it falls: it rarely remains more than two days on the ground, except on the mountains. The winters are more characterised by rain than cold. From the middle of October to the middle of March the rains are almost incessant, and are accompanied with tremendous thunder and lightning. The winds which prevail at this season are from the south and south-east, and they usually bring rain; while those from the north and north-west bring fair weather and a clear sky. From the middle of March to the middle of October the weather is serene and delightful; only a few showers of rain fall, but in the morning the dews and fogs are very heavy. As to the interior of the country, we only know that the winters are severe, but the quantity of snow is not great; and during the summer there is frequently a want of rain, which is probably the main reason of the sterility of this part of the country.

The interior of the country is inhabited by several Indian tribes, among which the Flat-heads, on Clarke and Columbia rivers, and the Snake Indians, or Shoshonees, on Lewis river, are the most numerous. They have many horses and dogs, and live chiefly on the produce of the chase. They frequently resort to the countries east of the Chippewyan Mountains to hunt the buffalo, which is not found west of the range. The smaller tribes, which inhabit the country along the Pacific, gain their subsistence by fishing. Several kinds of fish abound in the rivers, especially sturgeon, salmon, and a smaller kind of salmon called *uthlecan*. The wild animals are the deer, black and grizzly bear, a species of antelope, the asbata or big-horn, the beaver, the sea and river otter, the musk-rat, fox, and wolf: the puma is sometimes met with. This seems to be the most northern country on the western side of America where the puma is found. On the eastern side of the United States it is met with in the Essex Mountains, in the state of New York.

The *Central Region*, which extends along the coast from the Sound of Juan de Fuca to Behring's Bay, is still less known, with the exception of the coast and the numerous islands which skirt it. Though the Hudson's Bay Company has of late years formed several establishments in the interior, and particularly south of 55° N. lat., we possess little information respecting its natural capabilities. The Chippewyan Mountains continue to form two ranges, about 100 miles from one another. The eastern range, south of 55°, is by far the more elevated, and contains many snow-capped summits, among which Mount Hooper rises to 15,690 feet, and Mount Brown to nearly 16,000 feet. Its general elevation seems to be above the vegetation of trees. It does not appear that there are any deep depressions in this part of the range. No part of the western chain attains the snow-line. Between these ranges is the valley of the Upper Columbia river, which finds its way through a deep

in the western range, which it traverses with numerous rapids and cataracts. North of 55° N. lat. both ranges seem to be of nearly equal height, and both of them are in several places covered with perpetual snow. The western range constitutes one uninterrupted mass of mountains, but the eastern is broken by some narrow clefts, through which the rivers carry off the water that is collected in the valleys between the two ranges. Two large rivers, of which the southern is called the Peace river, or Unjigah, and the northern the Southern Branch of the Mackenzie river, or Turnagain, drain the valleys enclosed by the two ranges and their offsets between 55° and 60° N. lat., and after traversing the eastern range by narrow valleys, they enter the great plain east of the Chippewyan Mountains; the Peace river falls into the Slave river, and the Turnagain river into the Mackenzie river. The valleys which are drained by the upper courses of the Columbia, Peace, and Turnagain rivers are probably still more elevated than those of the southern tributaries of the Columbia river. Mackenzie experienced a great degree of cold in June on the Peace river, even at the place where it breaks through the mountain-range. Mountains which rose only 1600 feet above their base were then covered with snow. The valleys contain very little level ground along the watercourses. At a short distance from the banks of the rivers there are high rocks, from the summit of which level plains extend to some distance, but most of these river-basins have a broken surface. The rocky masses advancing in the form of ridges, from both ranges, to the very banks of the rivers, are only furrowed by narrow valleys, in which the rivers run between steep rocks; these valleys are almost entirely covered with wood. In the lower tracts along the rivers there are willows and alders, and on some detached spots there are spruce and white birch. The uplands are principally covered with pines, cypress, spruce, and a few other trees. None of these valleys are inhabited, and only a few natives resort to them in summer and in the earlier part of autumn. They abound in beaver and moose-deer, and in some tracts rein-deer are found. Mackenzie saw a humming-bird on the Peace river, near 54° 30' N. lat., which appears to be the northern limit of this bird: swans, geese, and ducks are numerous, but fish is not plentiful.

The country which begins at the base of the western range of the Chippewyan Mountains, and extends westward for about 80 miles from the sea, occupying on an average a width of more than 100 miles, may be considered as an uneven plain. Rocky ridges of moderate elevation run through it in every direction, but they are generally at some distance from each other, and the intervening plains are of considerable extent. The surface of these plains, which in many places is level, and in others undulating and hilly, is at a considerable elevation above the sea-level, which is shown by the deep depression of the streams, and by their very rapid course. A considerable portion of this plain is covered with swamps and lakes. The smaller lakes seem to be very numerous, and some of them are of great extent. According to a vague estimate, it is said that perhaps one-fifth of this plain is covered with water. Though the bare rocks often appear on the surface, they do not occupy a large portion of the country, it being generally covered with trees of heavy growth. The climate of this plain seems to be characterised by great humidity. When Mackenzie crossed it in June and July, he had merely two or three days of fine weather in succession, and it sometimes rained several hours for many days together. To this excessive humidity of the atmosphere we may probably ascribe the vigorous vegetation of this country. The forests, which cover nearly the whole region, and consist chiefly of pine, hemlock, cypress, spruce, white birch, and poplar, contain a great number of excellent timber-trees; the underwood, which is dense, consists of many fine shrubs. These forests contain many fur-bearing animals, especially beavers and otters. Several species of deer, with the moose-deer and the ground-hog, are abundant. The natives, who appeared to Mackenzie to enjoy a greater portion of comfort than the tribes east of the Chippewyan range, live in convenient houses, and gain their subsistence mainly by fishing. The rivers abound in several kinds of fish, particularly salmon and trout.

Fraser river runs through nearly six degrees of latitude, and its course is probably 500 miles. It is called by the natives Tacoutche Tesse, at least in the upper part of its course. It rises near the source of Peace river, and runs

southward, but towards its mouth it turns west, and falls into the Sound of Juan de Fuca. Though its course is rapid, it is navigable for canoes, except where it is interrupted by cataracts. There are several establishments of the Hudson's Bay Company on its banks.

Along the coast of the Pacific the country is mountainous, and occupies a width probably of 80 miles. Between the mouth of Fraser river and Smith Inlet, a distance of more than 200 miles, it appears to constitute one uninterrupted mass of high mountains, the declivities of which extend to the shores of Queen Charlotte Sound, which separates the large island of Quadra and Vancouver from the continent. Farther north it occurs in more isolated masses, the openings between which are occupied by inlets extending thirty miles into the rocky masses, and by wide valleys, through which the rivers discharge their abundant waters into these inlets. The higher part of these mountain-masses, which generally occurs between 30 and 40 miles from the sea, rises above the snow-line, and in many parts the icy masses which cover the summits form glaciers, which occupy a considerable part of the declivities. Several of these mountains appear to be of volcanic origin, but active volcanoes are not so common as in the region which skirts this coast toward the north. The shores of the Pacific are high, and rise with a steep ascent from 300 to 700 feet, and in many places still higher. At a short distance from the shores the mountains attain a great elevation. The climate along the coast is extremely mild, the rivers not being covered with ice before the middle of January; but it is also very humid, in consequence of the western and south-western winds, which blow from the Pacific nearly all the year round, and, passing over an immense expanse of water, absorb much moisture, which descends in rain when the winds reach the high mountains that extend along the shores. The vegetation is extremely vigorous. The cypress and pine trees, which cover the western declivities of the mountains, attain a greater height and size than in any other countries: some have measured above 30 feet in circumference. The natives of this tract seem to form a numerous tribe, known by the name of the Wakash Indians. Mackenzie found them living in large and commodious houses, and in the enjoyment of many comforts. They live mostly by fishing, as their rivers abound in various kinds of fish, especially salmon, which are taken in weirs constructed with great ingenuity. The sea-otter is very common along the whole of this coast, which has been visited of late years by European vessels for the purpose of procuring the skins, which fetch a high price at Canton.

The islands which skirt this coast partake strongly of the natural features of the adjacent continent. They consist of high mountains, which for the greater part of the year are covered with snow: their shores are rocky and high; and they are only partially covered with forest-trees. The most southern and largest of these islands is that of Quadra and Vancouver, which has an area of more than 13,000 square miles, or about half the area of Ireland. The strait which divides it from the continent varies between two and ten miles in width, and is called Queen Charlotte Sound. On the western side of the island, or rather on an island separated from it by a narrow strait, is Nootka Sound. [Nootka Sound.] The islands which lie farther north along the coast are generally of moderate size. The largest are Aristizabal, Prince Royal, Banks, and Revillagigedo Island. About 50 miles west of Banks Island is Queen Charlotte Island, which has an area of about 10,000 square miles. Farther north is King George III. Archipelago, which comprehends a considerable number of large islands. The largest is Prince of Wales Island, on the western shores of which is Port Bucarelli, a fine and safe harbour surrounded by a range of high mountains, containing seven active volcanoes, from which fire and smoke issue in the midst of eternal ice. The largest of the other islands belonging to this archipelago are Sitka, Duke of York Island, and Admiralty Island. This chain of islands terminates at Cross Sound. North of Cross Sound a very high and lofty range runs along the shores, and its highest summit, Mount Fairweather, attains the elevation of 14,761 feet above the sea-level. This range extends to Behring's Bay. The climate of these islands is still more humid than that of the opposite coast. On the island of Sitka the harbours are open all the year round, though the small creeks which are enclosed by hills are sometimes covered with a thin coat of ice. A little snow falls in January and February, but heavy showers of rain

occur daily all the year round. Thunder-storms are rare in summer, but more frequent in winter. In winter the air is so charged with electricity, that for many hours together in the darkest nights a bluish green electrical light is seen on bars of iron which are exposed to the air. The attempts which have been made to cultivate grain have not succeeded. Though maize and wheat grew well at Nootka Sound, they did not ripen. Potatoes and several kinds of vegetables succeed well. The wood which covers the lower declivities of the hills and mountains consists chiefly of different kinds of fir, cypress, and balsam poplar; they are sometimes of great size. Whales, seals, sea-lions, and otters of different kinds abound.

The *Northern Region*, or the large peninsula which stretches between  $60^{\circ}$  and  $70^{\circ}$  N. lat. from  $130^{\circ}$  W. long. between the Pacific and the Polar Sea, and terminates at about  $166^{\circ}$  W. long. on the shores of Behring's Strait and the sea of Kamchatka, is the least known portion of the north-western coast of America. It is only the shores and their immediate vicinity which have been visited, and up to the year 1837 a part of the coast along the Polar Sea had never been seen by any European. Not far from Behring's Bay rises the high summit called Mount St. Elias, which is considered to be the highest mountain in North America, being 17,144 feet above the sea-level. It is connected by a lower ridge with the range of Mount Fairweather. At Mount St. Elias the mountain-mass, which so far north lies in a direction nearly due north-west, begins to run to the west, and continues in that direction to the shores of Bristol Bay, where it suddenly grows narrower, and forms the peninsula of Alashka or Aliaska, which is about 360 miles long, with an average width of 20 miles. It is not known to what a distance these mountains extend inland, as they have never been traversed by Europeans. Many of their summits rise above the snow-line, and several of them are active volcanoes, especially on the peninsula of Aliaska. The declivities of the mountains reach the shores of the sea, which are indented by numerous inlets.

The largest of these inlets are Prince William's Sound and Cook's Inlet, which enclose the elevated rocky peninsula of Tchougatchi. At the point where the peninsula of Aliaska is connected with the continent is the island of Kodiak, which is above one hundred miles long, and on an average fifty miles wide; it consists of rocky mountains of moderate elevation, with fine valleys between them. The climate along this coast is as humid and mild as farther to the south-east; snow does not lie long on the ground, and severe cold is not experienced. This is perhaps mainly to be attributed to the high mountains which shelter it from the north and north-east, and to the high ground of the peninsula of Aliaska, which extends west-south-west, and shelters the lower tracts from the north-west winds. Though the rocky coast, where it is exposed to the strong winds from the Pacific, is generally without vegetation, the shores of the inlets and the lower declivities of the surrounding mountains are clothed with fine timber-trees, fir, larch, poplar, silver poplar, alder, and willows. Earthquakes are common on the island of Kodiak and the adjacent coasts, as well as on Aliaska. The sea supplies the principal article of food for the natives; the most common fish are herring, cod, halibut, and salmon. Whales and seals abound. The fur-bearing animals, which have attracted the Russians to this coast, are sea and river otters, several kinds of foxes, among which the black fox is in high esteem, black, brown, and red bears, and several kinds of marmots, besides beavers, rein-deer, gluttons, lynxes, and some smaller animals. In the mountains a kind of wild goat is found.

The peninsula of Aliaska and the chain of volcanic islands which stretch from the extreme western point of the peninsula nearly to the shores of Kamchatka, separate the sea of Kamchatka from the Pacific. North of the peninsula is the Bay of Bristol, into which a river falls that brings down the water from the large lake of Shelekow. This lake is said to be nearly one hundred miles long, and about forty wide in the broadest part. In the vicinity of this lake the high mountains seem to terminate, or at least to remain at a great distance from the shores of the sea; for between Bristol Bay and Norton Sound the coast is low and inaccessible, the sea being shallow and the waves breaking upon the land. A considerable river, the Kuskowina, empties itself into the sea between Bristol Bay and Norton Sound; and north of its mouth is the island of Nunniwak, which is above one hundred miles long, and of moderate elevation.

On the shores of Norton Sound the country is low, but rises with a gentle ascent towards the interior. Cook found it well wooded in parts; and this seems to be the most northern place on the west side of America where trees attain a considerable size. Farther north the country is low, but in many places intersected with hills of clay, sandstone, and limestone, of moderate height.

The innermost recess however of the deep bay called Kotzebue's Sound appears to reach a country of primitive formation. At the innermost recess of this bay is a hill composed of pure solid ice, about 160 feet high. Over the ice there is a covering of bluish clay, from two to three inches thick, and immediately over that a kind of turf scarcely a foot deep: it is overgrown with most luxuriant grass. The teeth and bones of the fossil elephant are found imbedded in the ice, as in the similar masses of ice which occur in the Polar Sea on the coast of Siberia. The country which surrounds the isolated hills of this region is low and level, and partly covered with swamps, and the shores in many parts are lined with narrow lakes. The soil is either sandy, or composed of an elastic bog earth, on which some small plants and shrubs thrive well near the water-courses; but at no great depth below, the ground is frozen even in the beginning of the autumn. Cape Lisburne is formed by a limestone rock about 850 feet high, and some hills extend from it to Cape Beaufort. Farther on to Icy Cape, and thence to Cape Barrow, the country is low, intersected with small lakes, and covered with swampy moss. The animals which abound in this region are several species of foxes, among which the black fox is abundant, and also several species of *viverræ* and *glîres*. The dog is the only domestic animal, and the rein-deer is in a wild state. Otters and some marine animals, which occur farther south, disappear north of the Aleutian Islands, but the common seal is frequent, and the herds of morse in Behring's Strait are countless; their teeth form a considerable branch of trade. These seas contain six species of whales and four species of dolphins. The inhabitants of the shores of the Kamchatka sea seem to belong to the Esquimaux, and greatly resemble the inhabitants of the north-eastern shores of Asia, the Tschukutskoi; their languages seem also not to differ materially: they live exclusively by fishing.

Point Barrow, the most northern point of America on this side, is a long low spit, composed of gravel and loose sand, which the pressure of the ice has forced up into numerous masses, which at a distance appear like rocks. It projects several miles into the Polar Sea. From this point eastward to the mouth of Mackenzie river the coast declines a little to the south of east. This coast is low, consisting in many places of mud, the surface of which is frozen even in summer; and in other places of mud-banks rising from ten to twenty feet, except towards the mouth of the Mackenzie river, where they attain from sixty to eighty feet. The sea is very shallow, and covered with ice, either in pieces or extending in large unbroken sheets. In many places an open channel lies between the coast-line and the sea, which may be navigated by small boats, but in other parts the heavy ice is closely packed on the shore. The country adjacent to the coast is level and low from Point Barrow to nearly  $152^{\circ}$  W. long., a distance of more than one hundred miles, and the eye does not meet with a single hill. It appears then that the whole tract between Cape Lisburne and  $152^{\circ}$  W. long. is an alluvial plain, in which ice is found all the year round at a small depth below the surface. Between  $151^{\circ}$  and  $152^{\circ}$  W. long. there is a ridge of hills at no great distance from the shore, called Pelly Mountains. It is not known if these hills form the most western range with which the Chippewyan Mountains terminate, or if they constitute an isolated range. No range of mountains or hills is visible from the shore between  $151^{\circ}$  and  $146^{\circ}$  W. lat., a distance of more than one hundred miles. But from  $146^{\circ}$  W. lat. to the mouth of the Mackenzie river four distinct ridges are seen at a distance of from twelve to thirty miles from the shore. They are probably the northern extremity of the Chippewyan Mountains, and seem to indicate that this mountain-system towards its northern extremity consists of four separate ranges, divided from each other by valleys about twenty or thirty miles wide. The two most western chains, called Romanzow chain and British chain, are covered with snow, even in summer: the two others are free from snow in summer. These chains consist of slate rocks; their summits are round and naked, and between them are narrow valleys which contain grass. No bushes nor even shrubs are met

with, and the few families of Esquimaux live on the produce of their fisheries.

The countries described under this head are claimed by three powers, the United States of America, the British, and the Russians. The Americans claim the country traversed by the Columbia river. By the convention with the Russians in 1824, their claims are limited to 54° 40' N. lat.; but they claim all the country south of that parallel to 42° N. lat. The British however claim part of this coast. The Americans rest their claim partly on the discovery of the mouth of the Columbia river by Gray in 1792, though it appears that it had been visited in 1775 by the Spaniard Eceta, who called it Entrada de Eceta. Lewis and Clarke, two Americans, first crossed the country drained by the southern affluents of the Columbia river, but the principal branch was first visited by the agents of the Hudson's Bay Company. The opposite claims of the two nations are not yet settled. The Americans have formed no permanent settlements, but many of their citizens, who are engaged in the fur-trade, visit the southern affluents of the Columbia, as the most convenient mountain-passes over the Chippewyan range are between the upper branches of the Missouri and Lewis and Clarke rivers, but they complain much of the agents of the Hudson's Bay Company, who have permanent establishments on the Fraser river, and even on the Columbia itself. The British pass the Chippewyan Mountains between the sources of the Peace and Fraser rivers, which are only separated by a portage of 817 yards, according to Mackenzie. The claims of the Russians and the British have been settled by treaties, according to which the whole of the northern peninsula west of 141° W. long. belongs to the Russians, as likewise a tract along the coast as far south as 56° N. lat., and the greater part of the islands forming King George III. Archipelago. The settlements of the Russians are more important than the British. In 1799 a Company was incorporated under the name of the Russian American Company, for the purpose of trading along the north-western coast, and of hunting the fur-bearing animals, especially the sea-otters. Their most northern settlement is at Bristol Bay, at the mouth of a river called Nushagak. The establishment on the island of Kodiak, called Alexandria, is still more important. But the principal settlement is New Arkhangelsk, on the island of Sitka, where a town, with about 1200 inhabitants, has been built on a good harbour. The number of persons who are considered as Russian subjects amounts to more than 10,000, but only about 1500 are Europeans.

(Lewis and Clarke's *Travels to the Source of the Missouri*, &c.; Irving's *Astoria*; Mackenzie's *Voyages through the Continent of North America to the Frozen and Pacific Oceans*; *Voyages of Cook*, Meares, Portlock, Dixon, and Vancouver; Billing's *Expedition to the Northern Part of Russia*, by Sauer and Saryschew; *Voyage of Discovery to Siberia, the Frozen Ocean*, &c.; Langsdorf's *Voyages and Travels in various parts of the World*; Kotzebue's *Voyage of Discovery into the South Sea*, &c.; Beechey's *Voyage to the Pacific and Behring's Straits*; Franklin's *Second Expedition to the Polar Sea*; Dease and Simpson's *Account of the Recent Arctic Discoveries*, in the 'London Geographical Journal,' vol. viii.)

**NORTH, FREDERIC, EARL OF GUILDFORD**, better known by the title of *Lord North* (as he did not succeed to the earldom until within two years of his death), was born on the 13th of April, 1733. He was educated first at Eton, and afterwards at Trinity College, Oxford. On leaving the university, he went abroad for three years, and during that time resided successively in Germany, Italy, and France, cultivating the foreign languages. Almost immediately after his return to England, he married, in 1756, Miss Ann Speke, an heiress of an antient Somersetshire family.

In 1763 Lord North was appointed one of the lords of the treasury. Two years after, on the formation of Lord Chat-ham's (as it was called by Mr. Burke) 'tessellated' ministry, Lord North received the office of joint-paymaster of the forces, his colleague being Mr. George Cooke. In the speech in which Mr. Burke so happily described the general composition of this ministry, he thus specially alludes to the joint appointment of Lord North and Mr. Cooke:—'I venture to say, it did so happen that persons had a single office divided between them, who had never spoke to each other in their lives, until they found themselves, they knew

not how, pigging together, heads and points, in the same truckle-bed.' (*Speech on American Taxation*.) Lord Rock-ingham had previously offered him the chancellorship of the exchequer and the vice-treasurership of Ireland, both of which appointments he had refused. He became chan-celler of the exchequer in 1769, and at the same time leader of the House of Commons, on Charles Townshend's unexpected death. This too he at first declined; but he was afterwards prevailed on (we are told) by the princess of Wales and by his father, Lord Guildford, to accept this situation. In 1770, on the duke of Grafton's retirement, he became first lord of the treasury, still holding the chan-cellorship of the exchequer. George III. felt himself under an obligation to Lord North for extricating him, by the acceptance of the premiership, from the embarrassment which the duke of Grafton's retirement had caused; he warmly expressed his gratitude, became greatly attached to his new prime-minister, and never forgot the obligation, nor ceased to have a regard for him, till the coalition of 1784.

It is an interesting trait recorded by his daughter, Lady Charlotte Lindsay, in her letter appended to Lord Brougham's 'Historical Sketches' (first series), that Lord North would never allow himself to be called prime-minister. 'He never would allow us to call him prime-minister, saying there was no such thing in the British constitution.'

Lord North's ministry lasted from 1770 to 1782. Being defeated on the 22nd February, 1782, in the House of Commons, on the question of the continuance of the American war, he gave way to Lord Rockingham. That war is the chief characteristic of his ministry. There are two different questions to be considered in connection with this war, the question of its justice and the question of its expediency. The ministry and the opposition joined issue on both these questions. The opposition, including, with the exception of Lord North himself, and his supports Thurlow and Wedderburn, nearly all the intellect of the House, Burke, Fox, Dunning, and latterly Pitt (who entered parliament in 1780), contended, first, that the British parliament had no right to tax the American colonies, and therefore that a war in enforcement of British taxation was unjust; and secondly, that even if parliament had the right, it was inexpedient to enforce the right by war. Lord North maintained both the justice and the expediency of the war. But every year introduced of course new elements into the question of expediency; and it is now understood that Lord North himself disapproved of the continuance of the war for at least three years before his resignation in 1782, but that he persevered in its defence only in deference to the wishes of George III. Lady Charlotte Lindsay, in the letter already quoted, says, 'Although I do not believe that my father ever entertained any doubt as to the justice of the American war, yet I am sure that he wished to have made peace three years before its termination.' This statement is not inconsistent with the fact that Lord North, in the very last speech that he ever made, defended the American war; and this circumstance again renders it improbable that he should ever have thought or admitted it to be unjust, as has sometimes been supposed.

The following remarks show the nature of George the Third's opposition to Lord North's retirement, and convey a just censure on the conduct of Lord North:—'He was long resolved to quit the helm, because George III. insisted on a wrong course being steered—that helm which he ought to have quitted as soon as his mind was made up to differ with the owner of the vessel, unless he were permitted to follow his own course, and he was only kept at his post by constant entreaties, by monthly expostulations, by the most vehement protestations of the misguided prince against a proceeding which must leave him helpless in the hands of his implacable enemies, and even by promises always renewed to let him go, would he but remain for a few weeks, until some other arrangement could be made. It is fit that this certain and important fact should be stated, and we have before us the proofs of it under the hand of the royal suitor to his reluctant servant's grace and favour, whose apparently fixed purpose of retirement he uses all these expedients to defeat, or at least to obstruct and retard, if he cannot frustrate.' (*Historical Sketches of the Statesmen of George III.*, 1st series, p. 59.)

It was at the time the general opinion that Lord Bute retained his early influence with George III., and that Lord



North, nominally prime-minister, was but a puppet in his hands. [BURK, LORD.] This opinion, which contributed greatly to the general unpopularity of Lord North's administration, has been shown by Lord Brougham to be entirely erroneous. (*Historical Sketches; Edinburgh Review* for October, 1839.)

The Rockingham ministry, which succeeded Lord North's, was soon followed by an administration under Lord Shelburne, in which Mr. Pitt was chancellor of the exchequer, and which placed Lord North by the side of his former adversary, Mr. Fox, in opposition. In a short time arose the well-known and much-abused coalition. [FOX.] In April, 1783, a ministry was formed by the duke of Portland, in which Lord North and Fox were appointed secretaries of state. This ministry ended its career in December of the same year. The universal unpopularity of the coalition, and the king's unconstitutional opposition to Mr. Fox's India Bill, killed it. We are informed by Lady Charlotte Lindsay that the coalition was principally brought about by the agency of Lord North's eldest son, and of Mr. Eden, afterwards Lord Auckland. In reply to the abuse which has been heaped upon this coalition, it may be observed, that because statesmen have once differed, they are not to be precluded from afterwards combining, when the questions on which they have differed are set at rest, and others have arisen in which they conscientiously agree; but it is not to be denied that this league, formed against the peace which Lord Shelburne had obtained, was hated by the whole country, and deeply injured the character of the parties. [FOX.]

When Lord North retired from the premiership in 1782, he had been appointed lord-warden of the Cinque Ports. He succeeded to the title of earl of Guildford and to the family estates in 1790. Two years after, he died, in the sixtieth year of his age. In the last five years of his life he was afflicted with blindness. 'Lord North, when he was out of office,' says his daughter, 'had no private secretary. Even after he became blind, his daughters, particularly the two elder, read to him by turns, wrote his letters, led him in his walks, and were his constant companions.'

Lord North was not a statesman of first-rate powers, but yet of more than respectable ability. His administration of the finances, in his character of chancellor of the exchequer, was generally approved of. And again, though he cannot lay claim to the title of a brilliant orator, he was a good speaker. He spoke clearly, sensibly, with much wit, and with an uniformly good humour, which made him the great favourite of the House.

The following are interesting passages of Lady Charlotte Lindsay's letter. After describing her father's social qualities, she observes, 'Yet I think that he had really more enjoyment when he went into the country on a Saturday and Sunday, with only his own family or one or two intimate friends: he then entered into all the jokes and fun of his children, was the companion and intimate friend of his elder sons and daughters, and the merry entertaining play-fellow of his little girl, who was five years younger than any of the others. To his servants he was a most kind and indulgent master. If provoked by stupidity or impertinence, a few hasty impatient words would escape him, but I never saw him really out of humour. He had a drunken stupid groom, who used to provoke him, and who, from this uncommon circumstance, was called by the children "the man that puts papa in a passion;" and I think he continued all his life putting papa in a passion, and being forgiven, for I believe he died in his service.' And again: 'Lord North was a truly pious Christian; and although (from his political view of the subject) I believe that one of the last speeches he made in parliament was against the repeal of the Test Act, yet his religion was quite free from bigotry or intolerance, and consisted more in the beautiful spirit of Christian benevolence than in outward and formal observances. His character in private life was, I believe, as faultless as that of any human being can be; and those actions of his public life which appear to have been the most questionable proceeded, I am entirely convinced, from what I must own was a weakness, though not an unamiable one, and which followed him through his life—the want of power to resist the influence of those he loved.'

NORTHALLERTON. [YORKSHIRE.]

NORTHAMPTON. [NORTHAMPTONSHIRE.]

NORTHAMPTONSHIRE, an inland county of England, is bounded on the north by Lincolnshire, on the P. C. No. 1014.

north-west by Rutlandshire and Leicestershire, on the west by Warwickshire, on the south-west and south by Oxfordshire, on the south-east by Buckinghamshire and Bedfordshire, and on the east by Huntingdonshire and Cambridgeshire. Its form is very irregular; its greatest length is, from north-east to south-west, from the neighbourhood of Peterborough to that of Brackley, 68 or 69 miles; and its greatest breadth, from the neighbourhood of Daventry to Stoney Stratford, 27 miles. Its area is estimated at 1016 square miles. The population in 1821 was 162,483; in 1831, 179,336; showing an increase in ten years of 16,853, or 10 per cent., and giving 177 inhabitants to a square mile. In size it is the twenty-second of the English counties; in amount of population the twenty-seventh; and in density of population the twenty-ninth. Northampton, the county town, is on the Nene, 61 miles in a direct line north-north-west of London, or 67 miles by the mail-road through St. Alban's, Dunstable, Woburn, and Newport Pagnel.

*Surface and Geological Character.*—The surface of the county is undulating; the hills do not rise to a great height, but present gentle declivities separated by intervening vales watered by rivulets and rivers, and so irregularly grouped as not to admit of description. The highest land is about Daventry, where Arbury Hill rises to the height of 804 feet above the level of the sea. This and the neighbouring hills have the general appearance of a group of rounded conical knolls, and constitute by far the most varied and picturesque scenery in this part of the county. The north-eastern extremity of the county, near Peterborough, subsides into the great fen district.

The eastern border of the county, comprising the heights east of the valley of the Nene, adjacent to Huntingdonshire and Bedfordshire, is occupied by the Oxford clay, which forms the separation between the middle and lower divisions of the oolitic series. The northern part of the county; the central parts, as far west as the hills which overlook the valley of the Welland by Haringworth Park and Rockingham, and as far to the south-west as the high road to Nottingham, through Higham Ferrers, Kettering, and Rockingham; the south-eastern border, from Higham Ferrers to Towcester and Brackley; and some projecting or insulated portions beyond these limits, are occupied by the uppermost formations of the lowest division of oolites. At Collyweston and Easton, near the Welland, the slaty beds of the forest-marble are quarried for roofing-slates. They imbibe more water and retain it longer than the Westmoreland slates, but neither imbibe so much nor retain it so long as tiles do. On the slope of the hills on the right bank of the Nene, at Raunds and Stanwick, near Higham Ferrers, beds resembling forest-marble are worked for ornamental purposes; these beds yield a shelly stone of a blue colour, sufficiently compact to take a tolerable polish. The principal bed of this division of the oolitic series is the great oolite. Nearly all the rest of the central part of the county is occupied by the lowermost members of the oolitic series, which extend in some places to the western borders. The predominant beds are of red or rather reddish-brown ferruginous sands, intermixed with calcareous sandstone, which is quarried in some places, though it affords but an indifferent and unsightly material for architectural purposes. The western border of the county and one or two valleys penetrating into the interior are occupied by the lias. Limestone is got in great plenty in almost all parts of the county; the principal lime-works are at Duston and Kingsthorpe, near Northampton. Good clay for making bricks and tiles is found in various places.

*Hydrography and Communications.*—The greater part of the county belongs to the basin of the Nene, which is the principal river in it. A small portion of the north and north-west borders belongs to the basin of the Welland; another small portion on the west side, to the basin of the Severn; and the southern extremity of the county, to the basins of the Ouse and the Thames.

The Nene is formed by the confluence of two principal streams. One of these rises near Arbury Hill, 2 miles south-west of Daventry, and flows eastward to Northampton, where it is joined by the other principal stream, 'the northern water,' from the village of Naseby. At Northampton the Nene becomes navigable and flows north-east through the county by or near Wellingborough, Higham Ferrers, Thrapston, and Oundle; below Oundle it reaches the border of the county, which it separates for some distance from Huntingdonshire. At Peterborough the navigable channel of the

Nene leaves the county altogether, but the Muscal river, or Catswater drain, which is an ancient channel or arm of the river, follows the border some miles farther, till it unites with an arm of the Welland from near Croyland. The length of the Nene in this county or on the border is about 60 miles; that of the Catswater drain about 8 miles. Its principal tributaries are the Ise (24 miles long), which passes near Rothwell and Kettering, and joins the Nene near Wellingborough; and the Harper's Brook (15 miles long), and the Willow Brook (15 miles long), which rise in Rockingham Forest, in the north-west part of the county. These tributaries are not navigable.

The Welland rises at Sibbertoft in this county, 4 or 5 miles south-west of Market Harborough, and flows to the border of the county, which it separates successively from Leicestershire, Rutlandshire, and Lincolnshire. It passes near Rockingham in Northamptonshire, Market Harborough in Leicestershire, and Stamford and Deeping in Lincolnshire. Between Deeping and Croyland it quits the county. Just beyond the border of Northamptonshire there is a channel from the Welland which unites with the Catswater drain. That part of the course of the Welland which belongs to Northamptonshire may be estimated at 48 or 50 miles. The navigation commences at Stamford, from which town there is a navigable cut to Deeping. The Welland has no Northamptonshire tributaries of any moment; its principal feeders are from the other counties, which have been mentioned.

The streams belonging to the basin of the Severn are the Avon, which rises near Naseby, and has the upper part of its course in this county; and the Leam, which has a few miles of the upper part of its course on the border. The streams belonging to the basin of the Ouse are, the Ouse itself, which rises in the county near Brackley, and has part of its course on the border; and the Tow, which rises in the neighbourhood of Sulgrave, near the border of the county, west of Towcester. The streams belonging to the basin of the Thames are the Cherwell or Charwell, which rises at Charwellton, 5 miles south-west of Daventry, and some of its tributaries. All these streams are small in that part of their course which belongs to Northamptonshire.

The Carlisle and Manchester and the Halifax mail-coach road enters the county a few miles beyond Newport Pagnel, Bucks, and passes through Northampton to Market Harborough in Leicestershire. The Leeds mail-road enters the county near Souldrop in Bedfordshire, about 10 miles beyond Bedford, and passes through Higham Ferrers, Kettering, and Rockingham.

The Carlisle and Wetherby and the Edinburgh and York mail-road crosses the northern part of the county between Stilton in Huntingdonshire, and Stamford in Lincolnshire; and the Hull and Lincoln and the Louth and Boston mail-road, which branches off from that just mentioned at Norman Cross in Huntingdonshire, passes through Peterborough to Deeping.

The Grand Junction Canal enters the county near Stoney Stratford, and runs north-west, passing between Northampton and Daventry, until it joins the Oxford canal, two or three small detached portions of which are within this county. One of the summit-levels of the Grand Junction Canal is at Braunston, just within the western boundary of this county; and there are two tunnels, one at Braunston, 2045 yards long, and the other at Blisworth, between Towcester and Northampton, 3080 yards long. There is a navigable cut from near Stoney Stratford to Buckingham, the greater part of which is within this county; there is also a double railroad to Northampton.

The Grand Union Canal unites with the Grand Junction Canal at Long Buckby, not far from the Braunston tunnel; and with the Leicester Union Canal at Foxton, near Market Harborough. There is one tunnel in that part of the canal which is in this county: it is at Crick between Northampton and Lutterworth.

The London and Birmingham Railway crosses this county, following the line of the Grand Junction and Grand Union canals. The Woolverton station is just on the border of the county; and the Blisworth, Weedon, and Crick stations are within it. At Crick the railroad leaves the line of the Grand Union Canal and turns off to the left to Rugby in Warwickshire. A branch railroad from the London and Birmingham, by Northampton and Market Harborough to Leicester, has been proposed; and the projected Great

Northern Railway (for part of which line, viz. from London to Cambridge, an act has been obtained) was designed to pass through the north-eastern extremity of the county, from Peterborough to Deeping.

**Agriculture.**—The county of Northampton has many advantages in point of climate and soil, and has for a long time been comparatively well cultivated and productive. The soil is generally adapted to produce both corn and pasture of a superior quality. A small proportion only of the surface is poor from the thin staple of the soil or from a cold impervious subsoil; leaving out the natural woods, which are considerable, that which remains unproductive for want of cultivation is trifling, and could easily be improved. The climate is mild and healthy. The subsoil, being mostly rocky, allows all superfluous water to run down through it; and where a stratum of clay intervenes, the inequality of the surface allows a ready discharge of the water. The surface of the county, except a portion of low flat land north of Peterborough, may be, on an average, about 300 feet above the level of the sea; the greatest height does not exceed 500 feet, if we except the summits of some hills about Daventry, which may rise to the height of 500 feet above the sea.

The following elevations are from actual survey:—

	Elevation in ft.
River Ouse near Stoney Stratford . . .	200
River Nen above Northampton . . .	195
Grand Junction Canal at Blisworth and Weedon . . .	315
Grand Junction Canal at Braunston tunnel . . .	375
Buckley road, half a mile from Daventry . . .	430
The summit of the hills around Daventry, supposed the highest points in the county . . .	500

Owing to its inland situation and the absence of lofty hills, this county is not so subject to heavy and continued rains as those which lie farther west. The surface is pleasingly diversified by gentle swells and depressions interspersed with woods and plantations.

The richest soil in the county is perhaps the black mould of the fens, when they have been drained and cultivated; but the most desirable for the farmer is the brown crumbling loam of the uplands. Where this is of a sufficient depth, it will produce, with little trouble, abundant crops of wheat, beans, barley, and oats, and it is peculiarly adapted to turnips and all green crops. On such land the farmer will certainly thrive, if he does not neglect his business. The pastures are both rich and sound, and the cattle grazed in them in summer repay the capital laid out on them with good interest; while those which are kept on turnips in the yard, to be turned out in summer, or are stall-fed to bring them to a marketable state, convert the straw, which is everywhere abundant, into rich manure. These remarks indeed are only applicable to a very good soil, but they apply particularly to that hazel loam which is neither light nor heavy, which does not bake hard in drying, and although consisting chiefly of minute particles of clay, lime, and sand, does not retain too much water.

There is a considerable portion of limestone rock in the county, but there is no appearance of chalk. The calcareous portion of the soil, which, in some rich land hastily analyzed, was found to be from 10 to 15 per cent., is in a very divided state, and must greatly influence the fertility. The heavier kinds of soil, which are more retentive of water, are found to produce excellent pasture, and are accordingly left in grass, as the most profitable for the farmer, if he is well skilled in selecting cattle to graze, and has a sufficient capital. For although more food might be produced from the land by tillage, and more hands usefully employed and fed, it is very doubtful whether the farmer would be so well remunerated for his risk, trouble, and outlay, as he is by grazing cattle. As long as the price of meat is high in comparison with that of grain, which has been the case for many years past, the grazing of the rich lands of Northamptonshire, Leicestershire, and Lincolnshire will always produce the greatest rent and profit.

The implements in use in this county have been much improved of late years. The old clumsy plough, with or without wheels, which was the only one known a century ago in the midland counties, is now replaced by a neater instrument, the principal parts of which are of iron. The Rutland plough with two unequal wheels attached to the beam, one to run in the furrow last made, and the other on the unploughed surface, is in general use. It is a plough

easily held, and from some experiments lately made with great care by Mr. Handley, M.P. for Lincolnshire, it appears to be of less draught than the common swing-plough without wheels. Three horses and a driver are used even in very friable soils, and a Norfolk team of two horses abreast driven by reins in the plough is a rarity in the county.

The harrows, scarifiers, rollers, carts, and waggons have nothing peculiar in them. There are some threshing-machines on large farms, but the flail is still the principal instrument in use.

The old course of husbandry was the triennial; a clean fallow, wheat, beans, and oats on the best heavy soils, and wheat, peas, and barley on the lighter. The introduction of turnips and clover has changed the system, and greatly improved the produce. But where turnips are not suited to the soil, from its compact nature, the clean fallow, at least every fourth year, is still retained. On some lands barley or oats are sown after wheat. In the improved rotations the land is frequently left three years in grass, and then ploughed up again, which brings it to the convertible system generally adopted in the north. The most common error is that of cropping the land too often after it is broken up from grass, and reducing it to too low a state before it is recruited with manure or improved by pasturage. This error is not so injurious on very rich soils, but when the soil is of inferior quality it destroys all the advantage gained by several years' lying in grass. There is a great difference between natural inherent fertility, such as that of rich loams and alluvial deposits, and that which is produced by manuring and pasturage. The first will bear much ill usage, but the latter will not.

The permanent pastures are very good in most parts of Northamptonshire, and few landlords would permit a tenant to plough up any part of them. The extent of meadow-land of this description is reckoned in the Agricultural Report at 40,000 acres; if to this be added all that has been laid down since and the artificial grasses raised on arable land, we shall find that 80,000 acres at least are devoted to feed cattle, without reckoning the clover and other artificial grasses mown for hay.

In all old pastures, ant-hills are a great nuisance: when greatly multiplied the grass on them is of no value and they take up much ground. The best mode of getting rid of them is to open them when frosty weather sets in, by cutting them in the form of a cross by a sharp-edged spade, the four angular pieces thus cut are separated from the ant-hill by the spade and turned back on the adjoining grass. The earth, with all the ants and their eggs, is then dug out and spread over the ground, the grass pared off is replaced, and if this be done in rainy weather before a frost, no ants will appear in the spot thus treated, and the whole pasture may in this manner be restored to a level and equal turf.

The fattening of cattle is a principal object of the Northamptonshire farmer. Some breed their own bullocks, but this is only when they have some improved breed of their own. Earl Spencer, the Marquis of Exeter, and many others are great breeders, and find breeding as profitable as fattening; but the majority of farmers, who have not the same advantage, prefer buying cattle reared on less valuable land, justly thinking that an animal reared on poor land and in a severer climate will thrive better and improve faster than one bred in a mild climate and a rich pasture. Hence they buy Scotch and Welsh cattle in autumn, turn them into the pastures to eat the coarse grass remaining after the fat beasts are sent to market during the winter, and finish them on grass next summer. These animals improve greatly, and if they do not come to a large size, they give at least a very good profit. Some few farmers feed the Scotch cattle during the winter on turnips; but generally those who can spare turnips for this purpose buy a larger sort of cattle in the autumn. Many Hereford long-horns and Durham short-horns are bought in spring, carried on at grass till near winter, and then finished with turnips, oil-cake, and chopped straw. They make much and rich manure; and if they pay for the food which they have consumed, the farmer is satisfied. Any profit in addition to the manure is so much clear gain. The short-horn breed has of late become a favourite stock, and has almost superseded the once famous long-horns, chiefly from the example of Earl Spencer and the Marquis of Exeter, whose breeds of short-horns cannot be surpassed. At the Oxford agricultural meeting in 1839 Lord Spencer accepted a challenge which was offered by a well known Sussex breeder, who proposed to show 100

head of Suffolk beasts against the same number of any breed. The judges, having inspected both stocks, had no hesitation in giving their award in favour of Lord Spencer's short-horns, although one of the judges was from Sussex. In fact the improved short-horn breed unites as many good qualities as can well be found in any other breed; the Hereford disputes the prize of aptitude to fatten, but the Hereford cow gives so small a quantity of milk, that all the farmers in Northamptonshire who breed cattle prefer the short-horned breed. It is yet very doubtful whether the small Scotch Highland cattle do not pay fully as well for their pasture and stall-feeding as either the Hereford long-horns or short-horns, at least on land of an average quality.

The breed of sheep most common in the rich pastures of Northamptonshire is the improved Leicester: and since long wool has been in request, and sells dearer, in proportion to the weight of the fleeces, than the finest short wool, scarcely any other breeds are in repute. The South-downs, on account of the flavour of their flesh, may dispute the pre-eminence with the Leicester breed, but no other sheep can enter into competition with the latter. Some very fine flocks of breeding ewes are kept in the county, and rams are bought, or hired for the season at very high prices, from those whose chief business is to rear the best.

There are many considerable estates in Northamptonshire, but the farms are in general not very large. They are usually let from year to year, with the understanding that the tenant shall not be removed as long as he pays a fair rent and cultivates the land properly. This is very well on estates which are in settlement, but where they are liable to be sold, the tenant has no great security, and will not lay out much capital in useful improvements, of which he may not reap the benefit.

More leases have been granted of late years, and a more improved state of cultivation has been the consequence. The farm-buildings were described by Mr. Donaldson and Mr. Pitt, in their Surveys, as by no means worthy of the fruitfulness of the soil, being inconvenient both as to architecture and situation. In this respect there is now a manifest improvement. Many excellent farm-buildings and houses have been erected; and the respectability of the tenants has increased in proportion. The very large barns formerly thought indispensable to house the crop in are now much reduced. The corn is stacked in the open air, and better preserved by a covering of thatch. Frames of wood on stone or iron pillars receive the corn, which is laid with the ears inward, and forms a round or square stack ending in a cone or pyramid, which is covered with straw and well thatched. It is thus safe from vermin, and the air circulating around and through it, the grain when thrashed comes out hard and dry.

Gardens and orchards are not a remarkable feature in this county. Little or no cyder is made, barley supplying the favourite beverage. The woods are extensive, and many plantations have been made in the neighbourhood of the numerous residences of the nobility and gentry. The most considerable forest is that of Rockingham, part of which has been converted into farms from time to time. These woods have been much neglected till lately, and might have been made far more productive than they have been. The pasturage of deer and cattle, and the customary rights which existed from time immemorial, have prevented the increase of timber. The navigation of the Grand Junction Canal, which brings coals to different parts of the county, has much lowered the price of underwood for fuel; and the fall in the price of oak timber since the peace has likewise diminished the value of woods.

The following are the principal fairs held in Northamptonshire:—Broughton Green, June 24, 25, 26, general fair; Brockley, Wednesday after February 25, April 24, Wednesday after June 22, December 11, horses, cows, sheep; Brigstock, April 25, September 4, cattle; Brixworth, Whit Monday; Daventry, Easter Tuesday, June 7, August 3, October 2 and 27; Fotheringay, third Monday after July 6; Higham Ferrers, March 7, June 28, Thursday before August 5, October 11, December 6; Kettering, Thursday before Easter, Friday before Whit Sunday, Thursday before October 11, Thursday before December 21; Northampton, February 20, April 5, May 4, June 19, August 5, 26, November 28, December 19, cattle; Oundle, February 25, Whit Monday, August 21, October 12; Peterborough, July 10, October 2, horses; Rockingham, September 25, cattle, horses; Rothwell, Trinity Monday, lasts a week; Towces-



ter, May 12, October 29, cattle; Wellingborough, Easter Wednesday, Whit Wednesday, cattle, October 29, cattle and cheese; Yardley, Whit Tuesday, horned cattle.

*Divisions, Towns, &c.*—The county of Northampton, at the time of the Domesday survey, contained thirty hundreds; but the number has been reduced. There are now only twenty hundreds, the names of which, with their situation in the county, their respective areas, and their population in 1831, are as follows —

Hundred.	Situation.	Acres.	Pop. 1831.
Chipping Warden . . . .	W.	21,370	4,697
Cleley . . . . .	S.E.	26,620	7,413
Corby . . . . .	N.W.	59,400	10,434
Fawsley . . . . .	W.	49,190	14,157
Greens Norton . . . . .	S.E.	22,080	5,333
Guildenborough . . . .	W.	43,260	9,719
Hamfordshoe . . . . .	Central	16,530	8,178
Higham Ferrers . . . .	E.	30,430	8,236
Huxloe . . . . .	Central	41,790	12,837
King Sutton . . . . .	S.	48,250	12,435
Nasaburgh (or Peterboro' Liberty) . . . . .	N	52,860	15,624
Navisford . . . . .	E.	13,090	2,735
Nobottle Grove . . . .	Central	34,160	8,726
Orlbury . . . . .	Central	29,600	5,694
Polebrook . . . . .	E.	19,840	4,537
Rothwell . . . . .	N.W.	42,640	7,860
Spillhoe . . . . .	Central	19,170	21,201
Towcester . . . . .	Central	12,980	4,873
Willy Brook . . . . .	N.	27,490	5,790
Wymersley . . . . .	E.	36,060	8,857
		646,810	179,336

There are in the county, the county and market town and borough of Northampton; the city of Peterborough; the borough and market towns of Brackley and Higham Ferrers; and the market towns of Daventry, Kettering, Oundle, Thrapston, Towcester, and Wellingborough. Kingscliffe, Rockingham, Rothwell, and Weldon formerly had markets. Brackley (pop. 2107) and Peterborough (pop. 5553) are described elsewhere. [BRACKLEY; PETERBOROUGH.]

The county-town, Northampton, is locally in the hundred of Spillhoe, on the north bank of the Nene, 67 miles from London. Its origin is unknown. In the peace between Alfred and the Danes it is likely that Northampton was included in the Danish territory, and was one of the burghs, or a dependency of one of the burghs, which they formed in Mercia. In A.D. 918 or 919, and again in 921, the Danes of Northampton (or simply Hampton, Hamtonia, as Henry of Huntingdon calls it, though Florence of Worcester calls it Northamtun) with their earls Thurferth and Thurkytel, submitted to Edward the Elder. In the reign of Ethelred II. Northampton was nearly ruined by the Danes (A.D. 1010), and about the close of the reign of Edward the Confessor it suffered from the Northumbrian army under Morcar, or from the king's troops under Harold, which in consequence of civil dissensions met here. After the conquest, Simon de St. Liz, on whom the Conqueror conferred the earldom of Northampton, built a castle here: and in the following reigns several ecclesiastical councils and parliaments were held in this town. In the reigns of Richard I., John, and Henry III., there was a mint at Northampton. In the reign of Henry II. (about A.D. 1174), the townsmen, who sided with the king against his children, were, with the royal troops, defeated by Anketil Mallore, a supporter of the young princes. In the civil wars of John, Northampton castle was held for the king, and besieged in vain by the barons (A.D. 1215). Toward the close of the king's reign the castle was given to Fulke de Brent, and in a conflict between his soldiers and the townsmen a considerable part of the town was burnt. In the troubles of the close of the reign of Henry III., Northampton, held by the barons, was taken by the king (A.D. 1264). In 1265 Northampton was taken by the barons, but recovered by the king's party. In the commencement of the war of the Roses, a great battle was fought near the town (10th July, 1460), in which the Lancastrians were defeated by the earl of March (afterwards Edward IV.) and the earl of Warwick. The king, Henry VI., was taken; and the queen and the young prince escaped with difficulty. In the civil war of 1644 Northampton was taken by Lord Brooke and for-

tified for the parliament. In 1675 the town was nearly consumed by a fire.

The borough boundaries enclose an area of 1520 acres divided among the four parishes of All Saints (pop. 7333), St. Giles (pop. 3025), St. Peter (706), and St. Sepulchre (4287). The borough limits extend beyond the town, and include a considerable quantity of agricultural land on the north and east. The town is pleasantly situated on a slope rising from the north bank of the Nene, over the two branches of which, within the limits of the borough, are three bridges. It consists of several streets irregularly laid out: the two principal lines of street, of which one is along the Carlisle and Manchester mail-road, intersect at right angles. One of the bridges over the Nene, a handsome stone bridge of three arches, is at the south end of that street which runs along the Carlisle road, and at the entrance of the town from London. One of the other bridges is over the Northern water, at the western end of the other principal line of street. The houses are well built, chiefly of stone; and the streets are paved, and lighted with gas. The market-place is a large open area in the centre of the town. Among the principal edifices are the shire-hall, a spacious building of elegant Grecian architecture; the county gaol; the town-hall, an antient building; the borough gaol; the theatre, a building erected early in the present century; the barracks; and the infirmary, a handsome building on the east side of the town, erected and fitted up in 1793. All Saints church is in the centre of the town, at the intersection of the principal streets; it was erected after the great fire of 1675: it is a plain building of incongruous architecture, having in the centre a cupola supported on four Ionic columns. At the west end is the original embattled tower, which escaped the fire. St. Giles's Church, near the east end of the town, is a large cross church with portions of various styles. The western doorway is Norman; part of the chancel is early English, of very good composition; the east window is of decorated English; and several of the other windows are of perpendicular character. St. Peter's, near the West bridge, is a remarkably fine and curious specimen of enriched Norman. It consists of a nave with side aisles, separated from it by piers and arches; with a square western tower. The capitals of the piers in the nave are elaborately carved, and the arches have zigzag indentations running round them. [NORMAN ARCHITECTURE.] Three of the piers have diamond shaped or spiral mouldings. The tower has some curious Norman ornaments on the outside, and opens into the nave by an arch richly ornamented with zigzag mouldings. This tower has some singular buttresses, apparently added when the belfry story, which is of later date, was built. There is a small arched crypt continued east of the present chancel, which has been probably shortened. St. Sepulchre's is on the north side of the town: it was built probably about the beginning of the twelfth century, and is one of the few round churches: it has eight circular piers with Norman capitals, and plain pointed arches: there is a chancel with a north and south aisle on the east side of the round part, and a good tower and spire of perpendicular character on the west side. There are several dissenting meeting-houses; among them is the Castle Hill meeting, which contains a mural tablet to the memory of Dr. Doddridge, who exercised his ministry and conducted an academy for the education of ministers in this town for more than twenty years. Northampton had once seven churches: two have quite disappeared; a part of the third, St. Gregory's, near St. Peter's, is used as a school-house. Of the several religious houses which existed before the Reformation, the hospitals of St. Thomas and St. John yet remain. That of St. John, for infirm poor persons, consists of a chapel and a large hall, with apartments for the inmates; that of St. Thomas is for twenty poor alms-women: both these buildings have portions of early English, decorated English, and perpendicular character. Of the castle, which was near the West bridge, there are only the earth-works; and of the town walls there are no traces.

The principal branch of trade carried on in the town is boot and shoe making, in which upwards of 1300 men are employed. The articles are sent to London and other parts of England, or are exported. Considerable business is done in currying leather; some stockings and lace are made, but the lace making has much declined since the introduction of machinery. There are three iron-foundries. The trade of the town is facilitated by the navigation of the Nene,

and by the double railroad communicating with the Grand Junction Canal. The principal market-day is Saturday; it is a large cattle-market; there are two subordinate markets in the week; there are eight yearly fairs, three of them large horse-fairs, three others for live-stock, another for general merchandise, and another for sheep and cheese.

The assizes for the county are held here, also the quarter-sessions for the division, and the court of election for members of parliament for the southern division of the county. There are races in spring and autumn, held on a course to the north of the town. Northampton is a borough by prescription; it is mentioned as a borough in Domesday Book. The governing charter is of 36 Geo. III. By the Municipal Reform Act the borough has been divided into three wards, and has six aldermen and eighteen councillors. The revenue of the corporation arising from lands, tolls, &c. is nearly 1500*l.* per annum. There are quarter-sessions for the borough held regularly; and a Court of Record for civil suits, little used; the expenses of the police and the administration of justice are defrayed by a town-rate. There are numerous charities.

The livings of All Saints, St. Giles, and St. Sepulchre are vicarages, of the clear yearly value of 350*l.*, 111*l.* (with a glebe-house), and 149*l.* (with a glebe-house), respectively; that of St. Peter is a rectory united with the perpetual curacies of Kingsthorpe and Upton, of the clear yearly value of 860*l.*, with a glebe-house.

There were in the borough, in 1833, two infant-schools, with 232 children; six dame-schools, with 108 children; four endowed schools, with about 170 children; a central national day and Sunday school for the county, with 372 children in the week and 987 on Sunday; a Lancasterian school, with 508 children; twenty-seven other day-schools, with 629 children; one day and boarding school, with 29 children; and thirteen Sunday-schools, with 2180 children. Three of the endowed schools are for boys and one for girls; the boys are clothed as well as educated; the girls are entirely supported.

Higham Ferrers is in the hundred of Higham Ferrers, 65 miles from London. The area of the parish is 2260 acres; the population in 1831 was 965, more than a fourth part agricultural. The town stands on a rocky eminence half a mile from the eastern bank of the Nene, and consists chiefly of one long street running north and south. Its elevated site renders it clean and healthy; but the houses are generally poor, and the streets are not lighted. It has a large and curious church, formerly collegiate, having two naves of equal height, with small clerestory windows in each of the outer sides, and a north and south aisle, thus presenting three rows of piers and arches, and four spaces. Some of these piers and part of the tower are of early English character, but most of the church is of later date. Some of the windows are of decorated English character and good design; others are of perpendicular character. The western entrance is much enriched with sculpture; and the church contains an antique font, some good wooden screen and stall work, and some painted glass. The upper part of the tower is of later date and is surmounted with a crocketed octagonal spire. Near the church are a grammar-school (a fine stone building), and a bead-house or alms-house, founded by Archbishop Chicheley, which has some portions of good perpendicular character, but much mutilated. There are also some remains of the antique college, a portion of which has been converted into a dwelling-house. There is a town-hall of modern erection. The principal business of the place is shoe-making; the making of lace, which formerly was much followed, has declined since the introduction of machinery into that manufacture. There are seven yearly cattle-fairs.

The town was incorporated in the reign of Philip and Mary: the borough is not quite co-extensive with the parish. The municipal officers are a mayor, seven aldermen, thirteen capital burgesses, a recorder, &c.; this corporation was left untouched by the Municipal Reform Act. The borough returned one member to parliament from its first incorporation, until the passing of the Reform Act, by which it was disfranchised. The living is a vicarage, united with the chapelry of Chelveston and Caldecott, of the clear yearly value of 245*l.*, with a glebe-house. There is a Wesleyan Methodist chapel. There were, in 1833, six dame-schools, with 37 children; the endowed grammar-school, with 57 children; one other day-school, with 26 children; and two Sunday-schools, with 246 children.

Daventry is in the hundred of Fawsley, 72 miles from London. The area of the parish (including the hamlet of Drayton) is 4090 acres; the population, in 1831, was 3646, a very small portion agricultural. This town probably rose from the decay of the neighbouring British and Roman stations of Bennavenna and Isanavatia. During the civil war of Charles I. the neighbourhood of the town was the scene of some skirmishes. In 1660, General Lambert, who had collected a force at Daventry, to oppose the designs of General Monk for the restoration of the king, was taken prisoner near the town by Colonel Ingoldsby.

The town is on an eminence, and consists of two principal streets and some smaller ones, partially paved and lighted; the houses are generally neat and well built. The church is a modern building, consisting of nave, side aisles, and chancel. There are meeting-houses for the Independents and Wesleyan Methodists. The town has no manufacture, except that of whips. There is a market on Wednesday, and there are nine annual fairs, chiefly for cattle and horses. The Dissenting Academy at Northampton was removed to Daventry on the decease of Dr. Doddridge, A.D. 1752 [DODDRIDGE, PHILIP], and continued there under the charge successively of Dr. Ashworth, Mr. Robins, and Mr. Belsham, till A.D. 1789, when, on Mr. Belsham's resignation [BELSHAM, THOMAS], it was removed to Wymondley. It has since been transferred, under the designation of Coward College, to London.

Daventry is a borough by prescription; the corporation, under the Municipal Reform Act, consists of four aldermen and twelve councillors. By that Act, the town was not to have a commission of the peace, except on petition and grant. There were, before the Act, sessions held once a year. There is a small gaol, built within these few years. The corporation revenues are very trifling.

The living of Daventry is a perpetual curacy, of the clear yearly value of 344*l.*, with a glebe-house.

There were, in 1833, two day-schools, partially endowed, with 12 children; seventeen other day-schools, with 376 children; a national day and Sunday school, with 152 children, partly supported by an endowment and by subscription (some of the children are clothed); and four Sunday-schools, with 511 children.

Kettering is in Huxloe hundred, 74 miles from London. The area of the parish is 2840 acres; the population in 1831 was 4099, about one-eighth agricultural. The town is on the slope of a hill, at the foot of which runs a small brook, a feeder of the Ise. The market-place is spacious, and is surrounded by well-built houses and respectable shops. The church is a large and handsome building of perpendicular character, consisting of a nave, side aisles, and chancel, with a very fine tower and rich hexagonal crocketed spire at the west end. The west door and a four-light window over it are rich examples of the perpendicular style.

There are several dissenting places of worship. Wool-stapling and wool-combing are extensively carried on in the town; there is a considerable manufacture of shoes; and that of silk shag for hats has been lately introduced; about 200 men were, in 1831, employed in these last two branches of industry. The market is on Friday, and there are three yearly fairs for live-stock and pedlery. The living is a rectory, of the clear yearly value of 786*l.*, with a glebe-house.

There were, in 1833, a free grammar-school, with a good endowment, containing 37 boys; another endowed school, with 22 girls; nine other day-schools, with 194 children; one boarding and day school, with 22 girls; two national day and Sunday schools, with 195 children in the week and 298 children on Sundays; and four Sunday schools, with 525 children. Besides these there are several schools for teaching lace-making.

Oundle is in Polebrook hundred, 81 miles from London. The area of the parish, including the hamlets of Ashton, Biggin, Churchfield, and Elmington, is 5300 acres; the population, in 1831, was 2450, nearly one-third agricultural. The town is on a slope on the left bank of the Nene, which here makes a considerable bend, nearly surrounding the town, and is crossed by two bridges on opposite sides of the town: that on the north-east side, distinguished as 'the North bridge,' over which the road to Peterborough passes, is a fine bridge of several arches; connected with it is a causeway, raised on arches, to secure a passage over the flats near the river when the waters are out. The streets are

well paved and lighted, and the houses generally modern and well built. There are a commodious market-house and shambles. The church, which is large and handsome, consists of a nave with side aisles, chancel, large transepts, and a tower and spire 200 feet high. Most of the piers and arches and some of the windows are of early English character; the clerestory and several of the windows are of decorated English; the tower and spire, the south porch, part of the transepts, and several of the windows are of perpendicular character. Each part is excellent in its style. The tower has four pinnacles at the angles, and the spire is hexagonal and crocketed: they are peculiarly fine. The church contains some rich stalls, some good wood screen-work, and a few remains of antient stained glass. There are an almshouse and a grammar-school near the church. The market is on Thursday, and there are three yearly fairs for live-stock. Petty-sessions for the division are held every fortnight. The living is a vicarage, of the clear yearly value of 376*l.*, with a glebe-house.

There were, in 1833, an endowed free grammar-school, with 66 boys (28 on the foundation); an endowed charity-school for 30 boys, who are educated and clothed; another endowed school, with 12 boys; an endowed day and Sunday school in Ashton hamlet, with 14 children; two other day-schools, with about 30 children; two boarding-schools, with 85 children; a national day and Sunday school, with 123 children in the week and 175 on Sundays; and several Sunday-schools.

Thrapston is in Navisford hundred, 73 miles from London. The area of the parish is 990 acres: the population, in 1831, was 1014, above one-fourth agricultural. Thrapston is pleasantly situated on the right bank of the Nene, over which river there is a handsome wooden bridge of several arches. The houses are in general neat and well built, and there are several genteel residences in the vicinity. The church consists of nave, side aisles, chancel, and transepts, with a tower and spire at the west end. Most of the piers and arches, with a fine south door, are of early English character; the chancel and some other portions are of decorated English, and the tower and spire of perpendicular. In the chancel are three stone stalls, with rich mouldings and crocketed canopies. There are corn mills and a paper-mill on the river: and sand-pits and stone-quarries in the neighbourhood: some whips and lace are made. The market is on Tuesday, for corn and live-stock; it is the largest market in the county for swine: there are two yearly fairs for live-stock, pedlery, and shoes, and for hiring servants.

The living is a rectory, of the clear yearly value of 348*l.*, with a glebe-house. There were, in 1833, two boarding and day schools, with 103 children; the larger of the two was partly supported by an endowment; there were also three day-schools, with 56 children, and two Sunday-schools, with 207 children. There is a Baptist meeting-house.

Towcester, in the hundred of Towcester, is 60 miles from London. The area of the parish (which comprehends the hamlets of Caldicott, Handley, and Wood-Burcot) is 2790 acres: the population, in 1831, was 2671, one-third agricultural. Some antiquaries place here the station *Lactodorum* of the Antonine Itinerary; at any rate the termination 'cester' indicates that it was a Roman town. Numerous coins found here, especially on an artificial mound called Berrymont Hill, north-east of the town, confirm this conclusion. Traces of the Saxon works erected by Edward the Elder (A.D. 921) to defend the town from the Danes are yet discernible. Towcester is situated on the right bank of the Tow, and consists principally of one long street on the road from London to Coventry and Birmingham: this street is paved, and is lined with well built houses. The church is a neat building in the early English style; there are three dissenting places of worship, and three almshouses. The chief trade of the place is in boots and shoes, and in lace, all of which are made here: the town also derived considerable advantage from its situation on a great public thoroughfare, but it has probably suffered by the diversion of traffic consequent on the opening of the Birmingham railway. The market is on Tuesday, and there are two yearly fairs for live-stock and general merchandise. The living is a vicarage, of the clear yearly value of 217*l.*, with a glebe house. There were, in 1833, four dame-schools, with 30 children; a day-school, with 50 boys, partly or wholly supported by an endowment; four other day-schools, with 137 children; and four Sunday-schools, with 490 children.

Wellingborough is in the hundred of Hamfordshoe, 67 miles from London. The area of the parish is 4490 acres; the population, in 1831, was 4688, about one eighth agricultural. The town is on an eminence just above a little brook which flows into the Nene; and from half a mile to a mile from the left bank of the Nene itself. The town was rebuilt in 1738, after a dreadful fire. It now consists of a number of streets, irregularly laid out, the principal of which meet in the market-place: they are lighted, and, from the situation of the place on a slope, are generally clean. The houses are for the most part built of a red sandstone, on which rock the town stands. The church is large and handsome, and of various styles of architecture. A south door is Norman; the tower and spire at the west end are of early English, a fine specimen of the later period of that style, approaching in some parts to the decorated English. Some of the piers and arches of the nave, and the east window, a remarkably fine composition of five lights, with admirable tracery and mouldings, are of decorated English character; the rest of the church is perpendicular, of fine composition and execution. There are some antient screen-work and wood stall-work, and a modern font, a good imitation of antient work. There are several dissenting meeting-houses in the town. The principal manufacture of the place is that of boots and shoes. Many of the females are employed in making lace, though that branch of industry has much declined. A silk-mill has been established within a few years. The market is on Wednesday, and is a very considerable market for corn: there are two yearly fairs for live-stock, and a third for live-stock and cheese. Petty-sessions for the division are held every week in the town-hall. The living is a vicarage, of the clear yearly value of 400*l.*

There were, in 1833, sixteen infant or dame schools, with 187 children; an endowed grammar-school, with 44 boys; a 'lower school,' supported from the same endowment, with 100 boys; another free-school, with 60 children; two Lancasterian schools, taught by the same mistress, each held three times a week, for two hours and a half, and each attended by 32 girls; two other day-schools, with 48 children; and five Sunday-schools, with 797 children.

Wellingborough got its name from the wells or springs about the town. One of these, 'the red well,' a chalybeate, was formerly in high repute. Charles I. and his queen resided here, in 1626, under tents, in order to have the benefit of it.

Kingscliffe is in Wilbybrooke hundred, between Rockingham and Peterborough. The area of the parish is 4460 acres: the population, in 1831, was 1173. It is supposed to have received its designation from king John having had a hunting-seat here. The church is dedicated to All Saints; there are some almshouses. The market, formerly on Tuesdays, has fallen into disuse, but there is a yearly fair for cheese, linen, and turnery ware. The living is a rectory, of the clear yearly value of 525*l.*, with a glebe-house.

There were, in 1833, five day-schools (two of them endowed, another a national-school, and another partly supported by charitable contributions), with 137 children; one boarding and day school, with 31 children; and three Sunday-schools, with 87 children.

Rockingham is in the hundred of Corby, 83 miles from London. The area of the parish is 890 acres; the population, in 1831, was 296, chiefly agricultural. This place consists of one street, on the declivity of a hill running along the road, and is in the midst of Rockingham forest, antiently one of the largest forests in the kingdom. The town is said to have derived its origin from a castle built on the top of the hill by William I. for the defence of the extensive iron-works then carried on in the forest. Some of the earlier kings occasionally resided here. Many of the works were standing in Leland's time. It was fortified for the king in the civil war of Charles I., and besieged by Cromwell; at present the only remain is a grand entrance gateway, flanked on each side by a tower. Part of the church was destroyed during the siege of the castle by Cromwell; the remainder contains several sumptuous monuments. The market has been discontinued: there is a yearly fair for live-stock, clothes, and general merchandise. The living is a rectory, of the clear yearly value of 81*l.* There was, in 1833, one day-school, supported by Lord Sondes, with 40 children.

Rothwell, popularly Rowell, is in the hundred of Rothwell, 78 miles from London. The area of the parish is

4430 acres, with a population, in 1831, of 2002, including the chapelry of Orton and the hamlet of Thorpe Underwood; or excluding these, 3130 acres and 1875 inhabitants. The town is situated on the southern slope of a hill: the ruin of the market-house, begun by Sir Thomas Tresham, A.D. 1577, but never finished, is a remarkable object; it consists of a square area surrounded by large pointed arches, designed for the market, and a suite of rooms with wide square-headed windows over; the whole is ornamented with Doric pilasters, shields with arms, &c. The church has an embattled tower and a fine doorway of early English character. There is a large yearly fair for live-stock, pedlery, and leather. A few persons are engaged in weaving plush.

The living is a vicarage, united with the chapelry of Orton, of the clear yearly value of 145*l*.

There were, in 1833, three infant or dame schools, with 76 children; seven day-schools (one endowed, another a national-school, and two others supported by charity), with 238 children; and three Sunday-schools, with 431 children.

Weldon, distinguished as Great Weldon, is in Corby hundred, between Rockingham and Oundle. The parish has an area of 2350 acres, with a population, in 1831, of 338, half agricultural. Including the hamlet of Little Weldon, the area is 3680 acres, the population 778. The houses are chiefly built of stone. There are four fairs in the year for general merchandise. The living is a rectory, of the clear yearly value of 209*l*., with a glebe-house. There were, in 1833, two dame-schools, with 36 children; one day-school, with 30 children; and a national-school, with 70 children in the week and 96 on Sundays.

Braunston is a populous village in Fawsley hundred, near the union of the Grand Junction and Oxford canals, and about 3 miles north-west of Daventry. The church is large and handsome, with an octagonal crocketed spire 150 feet high. There is also near the upper end of the village a stone cross, surmounted with an entablature decorated with four busts, supposed to represent the four evangelists. Braunston had, in 1831, 1380 inhabitants.

Weedon-beck is also in Fawsley hundred, 4 miles south-east of Daventry. Its distinctive epithet 'Bec' was derived from the circumstance of a religious house being established here as a cell to the abbey of Bec in Normandy. It is sometimes also called Weedon-in-the-Street, from its situation on the Wailing Street. Wulfhere, king of Mercia, had a palace here. The church is an antient building, and contains portions in the Norman and the various styles of English architecture. There are one or two dissenting places of worship. The royal military dépôt at Weedon contains extensive barracks; spacious storehouses for artillery, small-arms, and ammunition; an hospital, and workshops for artisans: it is one of the finest establishments of the kind in Europe. The population of Weedon-beck, in 1831, was 1439.

Earl's Barton is in Hamfordshoe hundred, 4 miles south-west of Wellingborough: it had, in 1831, 977 inhabitants. The church is very antient, and has several peculiarities of structure. The tower is probably of Anglo-Saxon architecture, and very rude. It is divided into four stories, each of which is constructed with large but thin upright stones, disposed like the frame or wood-work of old timber-houses, and having the intervals between every two filled up with small stones, mortar, and rubble. There are a small west doorway in the lower story, and one or two small windows, unglazed, in the stories over it; and in the fourth story two large openings of several lights; the lights have semicircular heads, and are divided by stone partitions of the shape and appearance of balusters. The summit of the tower, which is embattled, is of late date. (Britton's *Architectural Antiquities*.) The southern doorway is of highly-enriched Norman workmanship.

Raunds is in the hundred of Higham Ferrers, 4 miles north-east of Higham Ferrers: it had, in 1831, a population of 1370. The church is large and handsome, with a remarkably fine and lofty tower and spire. The steeple is early English, and is one of the best specimens of that style in the county. The church has some early English piers and arches, some decorated windows, and some of perpendicular character.

Rushden, in the same hundred, is one mile and a half south of Higham Ferrers: it had, in 1831, a population of 1245. It has a cross-church, large and handsome, with a fine tower and spire of perpendicular character: the piers

and arches, the transepts, and part of the chancel, are of decorated English character. The north door is of early English date, and has over it a rich porch of perpendicular character. There are in the church some early English stalls, and some remains of screen-work and of stained glass. There is an octagonal font, of early English, on a pedestal of later date. A few persons are engaged in manufactures.

Wollaston is in the same hundred, 3 miles south-east of Wellingborough. It has a handsome cross-church, with a lofty tower and spire at the intersection.

Irthlingborough is in Huxloe hundred, two miles north-west from Higham Ferrers: it had, in 1831, a population of 1262. A considerable number of the working men are employed in shoe-making. The church, which is antient, had formerly a college, consisting of a dean, five secular canons, and four clerks. The ruins of the college buildings yet remain between the tower and the body of the church. The tower is square, of early English character and good composition, with an octagonal lantern on it of later erection. The church consists of a nave, with two aisles, a transept, and a lofty and spacious chancel: there are in the church some antient tombs and stalls. In the centre of the village is a stone cross, consisting of a shaft thirteen feet high, raised upon steps. There are two dissenting places of worship.

Kingsthorpe is in Spolhoe hundred, 2 miles north of Northampton: it had, in 1831, a population of 1344. There is a town-hall in the village for the meeting of the trustees of the manor, which is a royal demesne, held in trust for the benefit of the townsmen; there are also a dissenting meeting-house, and some trifling remains of a former hospital or almshouse, incorporated in the walls of cottages of later erection. There are considerable stone-quarries, extensive lime-works, and a brick-kiln in the parish, in which a considerable number of labourers are employed. The church is spacious, partly of Norman character, partly in the later styles: it consists of a nave, north and south aisles with chapels, and a lofty western tower and spire.

Moulton, a village a mile in length, 4½ miles north-east of Northampton, had, with the extra-parochial liberty of Moulton Park, 1334 inhabitants in 1831. In its church, which consists of a nave, side-aisles with chapels, chancel, south porch, and western tower, there are some piers and arches of Norman architecture. There are two dissenting places of worship.

Hardingstone is 2 miles south-east of Northampton, in Wymersley hundred. It had a population, in 1831, of 1036. The church has some portions of early English architecture, and there is in the parish, on an eminence in a commanding situation, near the road from London to Northampton, one of the crosses erected by Edward I. to the memory of his queen Eleanor; it was, till the restoration of Waltham Cross, the most perfect of the three which remain: it is octangular, on a base of eight steps, and richly ornamented. Near this cross are the traces of a camp, said to be Danish. The river Nene borders the parish; there are commodious wharfs and warehouses on it; and the railroad from Northampton to the Grand Junction Canal passes through it.

*Divisions for Ecclesiastical and Legal Purposes.*—The county is almost entirely comprehended in the diocese of Peterborough, which (with the small county of Rutland) it constitutes. It is in the archdeaconry of Northampton, the only one in the diocese. A small portion of the county on the south-west border is in the diocese of Oxford. (*Maps appended to the Third Report of the Church Commissioners.*)

That part of the archdeaconry which is in this county comprehends the ten rural deaneries of—1, Peterborough; 2, Weldon; 3, Oundle; 4, Higham Ferrers; 5, Rothwell; 6, Haddon; 7, Daventree; 8, Northampton; 9, Preston; 10, Brackley. There are five deaneries in Rutlandshire: making fifteen in all.

Northamptonshire was antiently included in the diocese of Dorchester, the see of which was removed afterwards to Lincoln. The diocese of Peterborough was taken out of this in the reign of Henry VIII. It is proposed by the Church Commissioners to augment the diocese of Peterborough by the addition of the county and archdeaconry of Leicester, subtracted from Lincoln.

The county is in the Midland circuit. The assizes are held at Northampton, the first town on the circuit to

which the judges proceed. The quarter-sessions are held at Northampton and Peterborough. The county gaol and house of correction is at Northampton. It comprehends eleven yards, eleven airing-rooms, twelve day-rooms, and seven work-rooms. There are borough gaols at Northampton and Peterborough. The number of prisoners committed in the year preceding Oct., 1834, was 655; in 1834, 444; and in 1836, 440.

Nine members were returned to parliament from this county before the passing of the Reform Act, viz. two knights of the shire, two members each for the city of Peterborough and the boroughs of Northampton and Brackley, and one member for the borough of Higham Ferrers. By that act the number of members was reduced to eight, Brackley and Higham Ferrers being disfranchised, and the county formed into two divisions, each returning two members. The northern division of the county consists of the liberty of Peterborough, otherwise the hundred of Nasaburgh, the hundreds of Wilbybrook, Polebrook, Huxloe, Navisford, Corby, Higham Ferrers, Rothwell, Hamfordshoe, and Orillingbury. The court for the election of the members is held at Kettering; and the polling-stations are Kettering, Peterborough, Oundle, Wellingborough, and Clipston. The southern division comprehends the hundreds of King's Sutton, Chipping Warden, Greens Norton, Cleley, Towcester, Fawsley, Wymersley, Spolhoe, Nobottle Grove, and Guilsborough. The court for the election of members is held at Northampton; and the polling-stations are Northampton, Daventry, Towcester, and Brackley. The extent of the borough of Northampton was unaltered by the Boundary Act: the city of Peterborough was augmented by the addition of such parts of the parish of St. John the Baptist as were not previously included in the city.

*History, Antiquities, &c.*—In the earliest division of our island it is doubtful whether this county was included in the dominions of the Coritani, or Coritavi (*Kopiravoi*, Ptol.), who inhabited Lincolnshire, Leicestershire, and the counties to the northward; or in those of the Catyechlani (*Katuyxλanoi*), who inhabited Buckinghamshire and Bedfordshire, and the counties to the south and south-east; or in those of the Icenii (*Σικενοι*, Ptol.), who dwelt to the east. Perhaps these nations may have occupied each a portion; and the Dobuni (*Δοβουνοι*) of Gloucestershire and Warwickshire may have also had some parts of the western border. In the Roman division of Britain, Northampton was included in the province of Flavia Cæsariensis. Watling Street crossed in a north-west direction through or near Towcester and Daventry: the Via Devana, another Roman road, parallel to Watling Street, crossed it near Oundle and Rockingham: the Ermine Street, more northerly in its course, crossed the north-eastern extremity from Castor, on the Nene, to Stamford; and one or two other ancient roads had a portion of their course in this county. Watling Street may be traced for many miles from the summit of Borough Hill near Daventry. On the London side of Weedon it is incorporated with the modern high-road. Parts of the Ermine Street are conspicuous between Castor, on the Nene, and Upton, and again in the parish of Barnack, not far from Stamford. Several Roman stations are usually considered to have been in the county, viz. the Tripontium, Bennavenna, Isanavatia, and Lactodorum of Antoninus; and the Brinavæ and Durnomagus of Richard of Cirencester.

Tripontium is now by pretty general consent fixed at or near Dow Bridge or Dove Bridge, which crosses the Avon, uniting the two counties of Leicestershire and Northamptonshire. Reynolds (*Iter Britanniarum*) fixes it at the village of Lilburn in Northamptonshire, not far from Dow Bridge, and about half a mile out of the line of Watling Street. There are the traces of a small fort, round which perhaps a town was formed. 'The area' of this fort 'contains about the fifth part of an acre. The southmost part is a square piece of ground, appearing to have been raised, and in its sides answering to the four quarters of the heavens. At the south-east and south-west angles are hillocks which have the appearance of bastions. From one angle to the other runs a bank of earth, and a like bank along the eastern and western sides. To the north-west is a large high mount, on which, according to tradition, there stood a fort or watchtower, of whose demolished walls the churches of Lilburn and Claycoton are said to have been built. Causeys, pavements, and ruins often dug up, show this town to have been formerly larger than at present.' (Bridges, *Northamptonshire*, quoted by Reynolds.) The

large high mount here mentioned is called 'the round hill;' it is between Lilburn and Dow Bridge, and is artificial. There are traces of other Roman camps near Lilburn. Various Roman remains have been found in this neighbourhood, at the village of Catthorp or Calthorpe, on the Leicestershire side of the river.\*

Bennavenna and Isanavatia (there are many various readings of both names) were most probably the same place, or were at least in the immediate neighbourhood of each other. They are supposed to have been the first a British and the second a Roman town. Bennavenna was probably on Borough Hill, a short distance east of Daventry, on which is one of the largest ancient camps or forts existing in the island. The form is very irregular, following the shape of the hill. The outer circumference of the ramparts is rather more than two miles and a quarter; the diameter from north to south one mile, from east to west at the widest point three furlongs; and the whole included area about a hundred and fifty acres. The defences were scarcely in any part confined to a single ditch and rampart: in one part there were as many as four ditches and five ramparts. The ramparts have been much lowered and the ditches filled up by the plough, and in some cases quite levelled. The circumvallation at the northern end of the camp is of a much bolder character than in the other parts. The foundations of the prætorium, or residence of the Roman commandant, were discovered in 1823; and walls, tessellated pavements, and utensils of various kinds were brought to light. They are amply described in Baker's *Northamptonshire*.

The Lactodorum of the Romans, which Stukeley and Gale fixed at Stoney Stratford, has been by later antiquaries fixed at Towcester. Berrymount Hill, an artificial mount on the north-east side of the town, was probably the work of the Romans; but few other Roman antiquities appear to have been discovered. The Brinavæ or Brinavis of Richard of Cirencester may be placed at Black Ground, near Chipping Warden, a village 9 miles from Daventry on the road to Banbury, where Roman coins and a great quantity of pottery have been discovered. A rampart ran north and south near this station for some distance, having a steep side to the west and a gentle slope to the east. It was probably designed for the defence of a frontier, and has been conjectured to have extended about sixteen miles from the Charwell to the Leam. Some small part of this bank is remaining near Warden, and is called Wallow Bank. Arbury Bank, not far off, is probably a part of it; and it is likely that this defence gave name to some neighbouring villages or hamlets, as Walton (Wall-town) near King Sutton, Aston-in-the-Walls, &c.

That a Roman town or station existed at Castor is evident not only from the name, but from the Roman remains, ruined walls, tessellated pavements, urns and other vessels of pottery, and coins in great number found here. Similar remains have been found at Chesterton, or rather at Water Newton in Huntingdonshire, just across the river: either Castor or Chesterton was probably the Roman Durobrivæ mentioned in the Antonine Itinerary: the Map of Ancient Britain published by the Society for the Diffusion of Useful Knowledge places Durobrivæ in Huntingdonshire, and the Durnomagus of Richard of Cirencester on the Northamptonshire side: perhaps the two may be identical, and the ruins on the Northamptonshire side the town, which grew out of the station on the opposite bank, or was dependent upon it. [HUNTINGDONSHIRE.] We learn from Tacitus that the Roman general Ostorius Scapula, proprætor in Britain in the time of Claudius, fortified the line of the Nene by a chain of posts. [BRITANNIA.]

Numerous indications of Roman residences or posts may be traced along the valley of the Nene. At Cotterstock, a little below Oundle; at Drayton House, Lowick, near Thrapston; and at Woodford, just above Thrapston—all near or upon the left bank of the river, tessellated pavements or other antiquities have been discovered. At Ringstead near Thrapston, and at Chester in Irchester parish, near Wellingborough, both on the right bank of the Nene, are the remains of camps or posts; and at the latter, fragments of tessellated pavements, coins, &c. have been dug up. At Stanwick, between these posts, fragments of a tessellated pavement have been discovered. At Heyford, on the right bank of the Nene, above Northampton, and at

\* In the account of Leicestershire, it is stated that Tripontium was supposed to be at Catthorp, on the Northamptonshire side of the river. It should have been Lilburn, not Catthorp, which latter is on the Leicestershire side.



Piddington, on the road from London by Newport Pagnel to Northampton, pavements have been dug up; and at Cogenhoe, on the right bank of the Nene, below Northampton, some Roman coins and an urn were found. At Weedon-Beck are the remains of a post or station, a large camp (called Castle Dykes), and other antiquities; and on Arbury Hill, in the parish of Badley, near Daventry, is a rectangular camp, generally supposed to be Roman. At Barnack, between Peterborough and Stamford, antiquities have been dug up, and at Weldon have been discovered extensive tessellated pavements, foundations, coins, and other indications of a large mansion or of a town. At Guilsborough, north-west of Northampton, and between Aynhoe and Newbottle, in the southern extremity of the county, there are camps, probably Roman.

It seems not unlikely that several of these posts belonged to the line of defence formed by Ostorius. Durobrivæ may have been the first station above the fens, which formed of themselves a sufficient defence on that side. Ringstead, Chester, Weedon-Beck, and Arbury Hill forts were probably the work of Ostorius; and the post of Isanavatia or Bennavenna we may reasonably suppose to have been fortified by him. At Isanavatia, or at Arbury Hill, at the head of the Nene, the line of defence probably turned southward, past Brinnæ, or Chipping Warden, and the bank and ditch of which there are traces in that neighbourhood may have formed part of it. At what point it turned westward and joined the Severn can scarcely be determined. Raynsbury camp, in the south part of the county, was probably a post on this line.

The county was included in the Anglo-Saxon kingdom of Mercia; and Wulfhere, king of Mercia, had a palace at Weedon-Beck. In the invasion of that kingdom by the Danes, the monastery of Medeshamstede, now Peterborough, was destroyed, and, upon the extinction of the Mercian dynasty, the county was divided between the West Saxons and the Danes, the former having all to the south-west and the latter all to the north-east of Watling Street (A.D. 880 to 883). The Danish part was probably dependent on the community of the Danish burghs; the West Saxon part was governed successively by Ethelred and his widow Ethelfleda, daughter of Alfred, upon whose death (A.D. 920 or 921), Edward the elder, king of Wessex, assumed the direct administration of the government. He fortified Towcester, which was on Watling Street, and therefore a frontier town, and reduced the Danes of Bedford and Northampton to subjection (A.D. 921). At the commencement of the reign of Edmund I., the Danes, whom Athelstan had subdued, revolted (A.D. 942); but those of the Danish burghs, including those of Northamptonshire, submitted to the supremacy of Edmund. By a subsequent treaty, all to the north-east of Watling Street was ceded by him to his Danish competitor Anlaf, but was recovered to the Anglo-Saxons by Edred. Little that is worth notice occurred in the county antecedent to the Conquest; though several towns or other places are mentioned in the Saxon Chronicle or other antient records.

Of the Anglo-Saxon period there are memorials in Brixworth church and the tower of Earls' Barton church: the former will be presently noticed; the latter has been already pretty fully described. Upon the Conquest different lordships in the county were granted to the families of St. Liz and others. Simon de St. Liz built the castles of Northampton and Fotheringay; William the Conqueror is thought to have built Rockingham Castle; and Thorold, a Norman, appointed abbot of Medeshamstede, or Peterborough (which had been rebuilt after its ruin by the Danes, King Edgar and his queen, with the archbishops of Canterbury and York, and a splendid retinue of nobles and clergy, attending at the foundation of the new building), erected a castle within the precincts of the abbey, probably for defence against Hereward le Wake, who had occupied the Isle of Ely. The defence was insufficient; the town was burned and the monastery plundered by the Danes, the allies of Hereward.

In the reign of William Rufus (A.D. 1094) a great council or parliament was held at Rockingham to determine the dispute between the king and Anselm, archbishop of Canterbury, respecting the right of investiture and obedience to the see of Rome. In the following years the principal events occurring in the county were the struggles for the town or castle of Northampton in the civil wars of Henry II., John, and Henry III. Twice in these contests the students of Oxford sought refuge from civil strife within this county.

P. C., No. 1015.

In the reign of John (A.D. 1212) the members of Magdalen College retired to Brackley Hospital, which was in their possession; and in the time of Henry III. many students who, from various causes, had left Oxford, took refuge at Northampton, where steps were taken to establish a new seminary. A similar emigration from Cambridge to Northampton occurred in the same reign, but a royal mandate compelled the students to return. Both Henry III. and Edward I. frequently resided at Northampton; and in the reigns of Edward II. and III. and Richard II. several parliaments were held here: at the last of these was voted the poll-tax, which led to Tyler's rebellion. The battle of Northampton, in the civil war of the Roses (A.D. 1460) has been noticed. Another battle was fought in this county during that contest. The men of the North, excited probably by the intrigues of the earl of Warwick, rose against Edward IV., under a leader called Robin of Redesdale (A.D. 1469). These insurgents defeated a Royalist force, under William Herbert, earl of Pembroke, at Edgecote, on the border of the county towards Oxfordshire. Four thousand of Pembroke's men fell; and himself and other leaders, being taken, were beheaded next day at Northampton. This was the last event of importance in the county before the Reformation.

Of antient ecclesiastical monastic or castellated architecture the county possesses several specimens. Brixworth church, between Northampton and Market Harborough, is one of the most remarkable. It consists of a nave, south aisle, chancel, west tower, and staircase turret on the western side of the tower. The present nave has but one aisle, and that an addition to the original building; but from the foundation of an aisle discovered on the northern side, it appears that the present nave consists of the eastern extremity of the original nave deprived of its aisles, and of a portion if not the whole of the original chancel, and that the present chancel is a subsequent addition. 'The walls are mostly built with rough redstone rag, in pieces not much larger than common brick, and all the arches turned, and most of them covered with courses of red bricks or tiles, as they may be called, precisely similar in quality and size to those found in Roman works discovered in this county; and over the balusters of the window looking from the tower into the nave these bricks are used as imposts.' (Rickman's *Gothic Architecture*.) The church has undergone great alterations; the arches opening from the original nave into its aisles have been for the most part stopped up; the staircase turret, the belfry story of the tower and a lofty spire, and an aisle on the south side of the nave added in later times; windows of various dates, sizes, and styles inserted; and other changes made at various times from the Conquest to the Reformation. It is probable that this church was erected in the time of the Romans; and if so, it is the only ecclesiastical monument of that people in the country, as well as the most antient of our ecclesiastical edifices.

Brigstock Church, between Oundle and Rothwell, is another curious church, but the antient work forms only a small proportion. The tower is of very rough masonry plastered, and has a roughly-built round staircase turret on the west side, like Brixworth. The arch into the nave has large plain blocks for imposts and a projecting stone round the arch: the tower opens into the north aisle by a semicircular-headed plain door, with a small window over it. There are several additions, as a belfry story and spire, of a later date, which present several interesting features.

Barnack church, near Stamford, has a tower probably Anglo-Saxon. The lower part has projecting stone ribs like those of the tower of Earls' Barton noticed in the preceding part of this article. The arch opening into the nave resembles that of Brigstock, but is much more ornamented, with an arrangement of the impost unlike any Norman work, but much like a rude attempt to imitate Roman mouldings.

Castor Church, near Peterborough, is a large and fine cross-church, with a Norman tower at the intersection. This tower displays almost every variety of Anglo-Norman moulding and ornament. The two upper stories present a very enriched appearance, having open arches and continued arcades round. Both the parapet of the tower and the spire are of later date. Other parts of the church, as well as the tower, present very interesting points. St. Peter's church, Northampton, described already, and Peterborough cathedral [PETERBOROUGH], have considerable portions of Norman architecture; also the parish churches of Brookhole, Castle Ashby, Cotterstock, Dodford, East Haddon, Harple-

Helpstone, Kingsthorpe, Maxey, Moulton, Peakirk, Pitsford, Polbrook, Weedon-Beck, and some others, have more or less of Norman architecture in them. Of these, Castle Ashby, Cotterstock, Maxey, Polbrook, Helpstone, and Pitsford are especially deserving of notice. Barnwell St. Andrew's, Aldwinkle All Saints, Canons Ashby, Easton, Finedon, Fotheringay (formerly collegiate), Lowick, Raunds, Rushden, St. Mary's Church at Stamford Baron, Stanwick, King's Sutton, Tichmarsh, Warmington, Whiston, Wilby, and Wollaston are also worthy of notice for their beauty or for the curious features they present. There are some ruins of the collegiate buildings adjoining to Fotheringay church.

Of St. James's abbey, Duston, near Northampton, founded by William Peverel, natural son of William the Conqueror, for Black or Austin canons (yearly revenue, at the dissolution, 213*l.* 7*s.* 2*d.* gross, 175*l.* 18*s.* 2*d.* clear), and of Pipewell Cistercian abbey, Great Oakley, near Rockingham (yearly revenue, at the dissolution, 387*l.* 8*s.* 0*d.* gross, 286*l.* 11*s.* 8*d.* clear), only the foundations and traces of the walls are remaining. A portion of the chapel of Catesby Benedictine nunnery, near Daventry (yearly revenue, at the dissolution, 145*l.* 0*s.* 6*d.* gross, 132*l.* 10*s.* 11*d.* clear); a portion, supposed to be the refectory, of the Cluniac priory at Daventry (gross yearly revenue, at the dissolution, 236*l.* 7*s.* 6*d.*); the conventual church of the priory of Austin canons at Canons Ashby, between Northampton and Banbury (revenue, at the dissolution, 127*l.* 19*s.* gross, 119*l.* 0*s.* 4*d.* clear); the kitchen and a few other vestiges (now incorporated in a farm-house) of Sewardley Cistercian priory, near Towcester (yearly revenue, at the dissolution, 18*l.* 11*s.* 2*d.* gross, 12*l.* 6*s.* 7*d.* clear), are the principal monastic remains. Queen's Cross at Hardingstone has been noticed. Geddington Cross, near Kettering, another of those erected by Edward I. in memory of his wife, is of triangular shape, elevated on eight steps, and divided into three compartments: the lower one solid, adorned with six shields charged with arms and other sculptured ornaments; the compartment above this consists of six pillars rising from an embattled turret, and supporting six decorated canopies; beneath these canopies are placed three statues of the queen. The upper compartment is richly adorned.

The castellated ruins are few. These are the earth-works of Northampton, Higham Ferrers, Brackley, Fotheringay, and perhaps one or two others, and the gateway of Rockingham. Barnwell Castle is a fine and interesting ruin: it consists of four massy round towers, with their connecting walls enclosing a quadrangular court: the western wall is dilapidated. The grand gateway, which still remains, is flanked by two round towers. Some of the ancient walls and works of this fortress are in almost as perfect a state as when first built, particularly the entrance gate and some vaulted rooms connected with it.

There are a few ancient mansions. Drayton House, Lowick, near Thrapston, is of the age of Henry VI.: it retains many of the features of an ancient castle. Fawsley House, 3 miles south of Daventry, the ancient seat of the Knightly family, is an incongruous pile of various dates. Northborough manor-house, between Peterborough and Market Deeping, now a farm-house, is of decorated English character, and some of its portions and details are very beautiful.

In the reign of Queen Elizabeth this county was the scene of the execution of Mary of Scotland, who was tried, condemned, and beheaded in Fotheringay Castle. This castle was entirely demolished by order of James I. when he came to the throne. This county possesses several memorials of the public men of Elizabeth's time. Burleigh or Burghley House, on the border of the county near Stamford, was built for the most part by the great Lord Burleigh, though many additions and alterations have been made by subsequent possessors. It is a vast pile, displaying magnificence rather than taste. Kirby Hall, Gretton, near Rockingham, was built by Sir Christopher Hatton, lord-keeper: it has been materially altered since. The more ancient parts of Castle Ashby, about 6 miles east of Northampton, were erected by Henry lord Compton. The offices of the manor-house of Ashby St. Ledger (near Daventry) contain a small room in which the gunpowder plot in the time of James I. was concocted. The house belonged to Catesby, one of the leaders in the conspiracy.

The battle of Naseby, which decided the civil war of Charles I., was fought in this county (A.D. 1645). The king

had a fortnight before taken Leicester by storm, and, marching southward by Harborough to Daventry, compelled Fairfax to raise the siege of Oxford in order to oppose him. On the approach of the parliamentary forces under Fairfax and Cromwell to Northampton, Charles retreated to the neighbourhood of Harborough, but finding his enemies close in pursuit, he determined to turn upon them. The battle was fought at Naseby, and each side mustered about 8000 or 9000 men. The right wing of each army, the Royalists under Rupert, the Parliamentarians under Cromwell, was victorious; but while Rupert wasted his advantage by inconsiderate pursuit, Cromwell decided the day by charging the Royalist centre in the flank and rear. The victory was decisive: the Royalists had 800 killed and wounded, the Parliamentarians rather more; but they took 4000 prisoners and all the artillery, besides other spoils of the greatest importance.

After the king had surrendered himself to the Scots at Newark, and been delivered into the hands of the Parliamentary Commissioners, he was brought to Holdenby, or Holmby House, about 6 miles north-west of Northampton. From this place he was carried off by Cornet Joyce, at the head of a party of horse, and taken to the army. Holdenby House, which had been built by Sir Christopher Hatton in the time of Elizabeth, was demolished by order of the parliament, and scarcely any remains are now left.

The only struggle which attended the restoration of Charles II. took place in this county. General Lambert, who had escaped from confinement in the Tower of London, appeared at Daventry with a few troops of horse, but, being attacked by Colonels Ingoldsby and Streater, and deserted by his own men, was captured and re-committed to the Tower.

(Baker's *History of Northamptonshire*; Bridge's *History of Northamptonshire*; *Beauties of England and Wales*; Conybeare and Phillips, *Outlines of the Geology of England and Wales*; Greenough's *Geological Map of England*; Lewis's *Topographical Dictionary*; Rickman's *Gothic Architecture*; Britton's *Architectural Antiquities*; Reynolds's *Iter Britanniarum*; Palgrave's *Rise and Progress of the English Commonwealth*; Sharon Turner's *Anglo-Saxons and History of England in the Middle Ages*; *Parliamentary Papers*.)

#### STATISTICS.

**Population.**—Northamptonshire is chiefly an agricultural county. In 1831 it ranked the twelfth on the list of agricultural counties: its place in this respect has fluctuated since 1811, when it was the tenth on this list; and in 1821 it was the eleventh. Of 43,793 males twenty years of age and upwards, only 582 were (in 1831) engaged in manufactures, and 21,907 were occupied in agricultural pursuits; out of this latter number 17,775 were labourers. Of the 582 employed in manufactures or in making manufacturing machinery, about 200 were engaged at Kettering in making shoes and weaving silk-shag; about 60 in weaving plush, at Rothwell, Chatcombe, and Eydon; there were 130 at Middleton-Cheney occupied as frame-work knitters, and about 70 more thus employed in other parts; 80 men in making carpets and preparing worsted for that purpose, 20 of them at Spratton, 13 at Hollowell; and there were 50 weavers of miscellaneous descriptions in several villages throughout the county. In the towns of Northampton, Wellingborough, Irthlingborough, and various other places, more than 2000 men were occupied as shoe-makers, in making shoes not consumed in the respective places; but these, for the sake of uniformity, were placed under the head of men engaged in trades and handicrafts, though more strictly speaking they are manufacturers.

The population of Northamptonshire, in each of the following decennary periods, was,—

	Males.	Females.	Total.	Increase per cent.
1801	63,417	68,340	131,757	..
1811	68,279	73,074	141,353	7·28
1821	79,575	82,908	162,483	14·94
1831	87,949	91,387	179,336	10·33

showing an increase, between the first and last periods, of 47,579, or more than 36 per cent. on the whole population; being 21 per cent. below the whole rate of increase throughout England.

The following table exhibits a summary of the population of every hundred, as taken in 1831—

HUNDREDS, CITIES, LIBERTIES, or BOROUGHES.	HOUSES.				OCCUPATIONS.			PERSONS.			
	Inhabited.	Families.	Build- ing.	Unin- habited.	Families chiefly employed in agri- culture.	Families chiefly employed in trade, manufac- tures, and handicraft.	All other Families not com- prised in the two preced- ing classes.	Males.	Females.	Total of Persons.	Males twenty years of age.
Cupping Warden (Hun- dred) . . . . .	972	1,059	3	25	671	233	155	2,321	2,376	4,697	1,163
Cleley . . . . .	1,462	1,633	10	24	960	415	258	3,557	3,856	7,413	1,803
Corby . . . . .	2,171	2,362	9	62	1,253	557	552	5,149	5,285	10,434	2,573
Fawsley . . . . .	2,944	3,096	13	73	1,373	992	731	6,787	7,370	14,157	3,363
Greens Norton . . . . .	1,115	1,186	5	26	750	274	162	2,638	2,695	5,333	1,385
Guildenburgh . . . . .	2,032	2,219	8	36	1,244	597	378	4,805	4,914	9,719	2,402
Hamfordshoe . . . . .	1,637	1,753	2	48	498	906	349	4,002	4,176	8,178	1,970
Higham Ferrers . . . . .	1,555	1,833	12	21	901	678	254	4,042	4,194	8,236	2,057
Huxloe . . . . .	2,567	2,745	5	75	1,217	975	553	6,192	6,645	12,837	2,998
King's Sutton . . . . .	2,529	2,705	6	48	1,678	675	352	6,132	6,303	12,435	3,092
Navisford . . . . .	516	555	5	9	306	154	95	1,338	1,397	2,735	633
Nobottle Grove . . . . .	1,825	1,929	8	59	1,071	470	388	4,302	4,424	8,726	2,168
Orlinsbury . . . . .	1,178	1,252	3	25	754	304	194	2,834	2,860	5,694	1,365
Polebrook . . . . .	879	998		27	489	289	220	2,280	2,257	4,537	1,057
Rothwell . . . . .	1,682	1,781	6	38	897	492	392	3,872	3,988	7,860	2,038
Spelhoe . . . . .	1,210	1,267		28	683	322	262	2,870	2,980	5,850	1,388
Towcester . . . . .	977	1,037	6	28	434	435	168	2,360	2,513	4,873	1,152
Willybrook . . . . .	1,160	1,312	3	18	730	416	166	2,904	2,886	5,790	1,462
Wymersley . . . . .	1,740	1,912	1	25	1,165	463	284	4,315	4,542	8,857	2,125
Northampton (Bo- rough) . . . . .	3,091	3,191	28	120	88	2,217	886	7,619	7,732	15,351	3,846
Peterborough (Li- berty) . . . . .	1,952	2,193	16	42	1,162	512	519	5,066	5,005	10,071	2,607
Peterborough (City) . . . . .	1,128	1,145	5	25	10	519	616	2,564	2,989	5,553	1,146
Totals . . . . .	36,322	39,163	154	882	18,334	12,895	7,934	78,949	91,387	179,336	43,793

*County Expenses, Crimes, &c.*—The sums expended for the relief of the poor at the four dates of

	£	s.	d.
1801 were	94,607	being	14 4 for each inhabitant.
1811 ..	139,675	"	19 9 "
1821 ..	145,093	"	17 10 "
1831 ..	150,816	"	16 9 "

The sum expended for the same purpose for the year ending March, 1838, was 77,163*l.*: and assuming that the population had increased from 1831 to 1838 at the same rate of progress as in the ten preceding years, the above sum gives an average of 8*s.* 0*d.* for each inhabitant. These averages are above those for the whole of England and Wales.

The sum raised in Northamptonshire for poor-rate, county-rate, and other local purposes, in the year ending 25th of March, 1833, was 169,614*l.*, and was levied upon the various descriptions of property as under:—

On land . . . . .	£150,467	3 <i>s.</i>
Dwelling-houses . . . . .	15,181	10
Mills, factories, &c. . . . .	1,756	13
Manorial profits, navigation, &c. . . . .	2,209	2
Total	169,614	8

The amount expended was—

For the relief of the poor . . . . .	£148,042	4
In suits of law, removal of paupers, &c. . . . .	3,742	18
For other purposes . . . . .	19,037	5

Total money expended 170,822 7

In the returns made up in subsequent years the descriptions of property assessed are not specified. In the years 1834, 1835, 1836, 1837, and 1838, there were raised 166,712*l.* 19*s.*, 144,112*l.* 4*s.*, 112,531*l.* 12*s.* (not given for 1837), and 89,419*l.* respectively; and the expenditure of each year was as follows:—

	1834.	1835.	1836.	1837.	1838.
For the relief of the poor	140,179	118,842	91,901	74,072	77,163
In suits of law, removal of paupers, &c.	3,311	2,498	2,006	1,148	863
Payments towards the county-rate	22,282	9,332	7,658	not given.	9,363
For all other purposes		13,123	10,440	4,396	5,568
Total money expended	£165,772	143,796	112,006		92,967

The saving effected in the sum expended in 1838, as compared with that expended in 1834, was therefore 72,815*l.*, or not quite 44 per cent., and the sum expended for the relief of the poor in 1838 was less than that in 1834 by 63,016*l.*, or more than 45 per cent.

The number of turnpike trusts in Northamptonshire, as ascertained in 1836, under the acts 3 and 4 William IV., c. 80, were 27; the number of miles of road under their charge was 358. The annual income arising from tolls and parish composition in lieu of statute duty, in 1835, was 37,990*l.*, and the annual expenditure in the same year was as follows:—

Manual labour . . . . .	£11,671	2
Team labour, and carriage of materials . . . . .	3,038	2
Materials for surface repairs . . . . .	6,923	5
Land purchased . . . . .	26	4
Damages done in obtaining materials . . . . .	456	0
Tradesmen's bills . . . . .	1,308	19
Salaries of treasurer, clerk, and surveyor . . . . .	2,302	16
Law charges . . . . .	641	16
Interest of debt . . . . .	3,161	7
Improvements . . . . .	769	19
Debts paid off . . . . .	2,950	4
Incidental expenses . . . . .	1,006	0
Estimated value of statute duty per- formed . . . . .	2,446	2

Total expenditure 36,701 16

The county expenditure in 1834, exclusive of that for the relief of the poor, was 6801*l.* 6*s.*, disbursed as follows:—

Bridges, building, repairs, &c. . . . .	£728	10
Gaols, houses of correction, &c., and maintaining prisoners, &c. . . . .	2,181	4
Shire halls, and courts of justice, build- ing, repairing, &c. . . . .	115	9
Prosecutions . . . . .	1,694	9
Clerk of the peace . . . . .	245	12
Conveyance of prisoners before trial . . . . .	470	12
Conveyance of convicts . . . . .	195	0
Vagrants, apprehending and conveying . . . . .	93	2
Coroner . . . . .	151	18
Miscellaneous . . . . .	935	10

Total expenditure 6,801 6



The number of persons charged with criminal offences in the three septennial periods ending with 1820, 1827, and 1834, were 765, 927, and 1219 respectively, making an average of 109 annually in the first period, of 132 in the second period, and of 176 in the third period. The number of persons tried at quarter-sessions in each of the years 1831, 1832, and 1833, in respect to which any costs were paid out of the county rates, were 49, 54, and 51 respectively. Among the persons charged with offences there were committed for

	1831.	1832.	1833.
Felonies . . . . .	44	48	48
Misdemeanors . . . . .	5	6	3

The total number of committals in each of the same years was 77, 72, and 53 respectively.

	1831.	1832.	1833.
The number convicted was . . . . .	58	55	39
Acquitted . . . . .	13	14	7
Discharged by proclamation . . . . .	6	3	7

There were 268 persons charged in 1838 with crimes at the assizes and sessions in Northamptonshire. Of these 38 were charged with offences against the person, 24 of which were common assaults; 12 were charged with offences against property committed with violence; 191 with offences against property committed without violence; only 2 were charged with malicious offences; 1 for uttering counterfeit coin; and 24 for various misdemeanors.

Of the whole number committed, 188 were convicted, 56 were acquitted, 3 were not prosecuted, and no bill was found against 20. Of those convicted, 2 were sentenced to death, but their sentence was commuted into transportation for life; 31 were transported for various periods; 2 were sentenced to two years; 28 to one year; and 115 to six months and under; 10 were fined, and 1 was found insane. Of the whole number of offenders, 234 were males and 34 females; 104 could neither read nor write; 148 could read and write imperfectly; 15 could read and write well; and one had received superior instruction.

The number of persons registered in 1837 to vote for county members was 8457. Of these, 5620 were freeholders, 41 leaseholders, 654 copyholders, 2021 occupying tenants, and 121 annuitants: being 1 in 21 of the whole population, and 1 in 5 of the male population twenty years of age and upwards, as taken in 1831.

Northamptonshire contains three savings' banks: the number of depositors and amount of deposits on the 20th of November, in each of the following years, were as under:—

	1832.	1833.	1834.	1835.
Number of depositors . . . . .	4,831	1,208	4,920	5,092
Amount of deposits . . . . .	£155,397	£37,873	£159,199	£160,271

The various sums in the savings' banks in 1836, 1837, and 1838, were distributed as under:—

	1836.		1837.		1838.	
	Depo- sitors.	Deposits.	Depo- sitors.	Deposits.	Depo- sitors.	Deposits.
Not exceeding £20 . . . . .	2,992	£21,129	3,115	£21,547	3,373	£23,598
" 50 . . . . .	1,413	42,414	1,600	48,463	1,667	62,168
" 100 . . . . .	604	42,143	637	43,915	678	46,935
" 150 . . . . .	192	23,129	210	24,344	181	27,890
" 200 . . . . .	109	19,615	100	18,051	116	19,735
Above . . . . .	66	19,036	70	19,475	64	18,416
	6,376	167,459	5,733	176,395	6,084	198,742

**Education.**—The following summary is taken from the Parliamentary Returns on Education made in the session of 1835.

	Schools.	Scholars.	Total.
Infant schools . . . . .	132		
Number of children at such schools; ages from 2 to 7 years:—			
Males . . . . .		636	
Females . . . . .		613	
Sex not specified . . . . .		935	
		—	2,184
Daily schools . . . . .	544		
Number of children at such schools; ages from 4 to 14 years:—			
Males . . . . .		8,471	
Females . . . . .		5,186	
Sex not specified . . . . .		2,454	
		—	16,111
Schools . . . . .	676		

Schools. Scholars. Total.

Total of children under daily in- struction . . . . .			18,295
Sunday-schools . . . . .	406		
Number of children at such schools; ages from 4 to 15 years:			
Males . . . . .		11,663	
Females . . . . .		11,668	
Sex not specified . . . . .		5,021	
		—	28,352

Assuming that the population between the ages of 2 and 15 years has increased in the same proportion as the whole of the population since 1821, and that the whole population has increased in the same ratio since 1831 as in the ten years preceding that time, the approximate number of children between the ages of 2 and 15 years thus found as residing in Northamptonshire in 1833 was about 60,307.

Sixty-seven Sunday-schools are returned from places where no other school exists, and the children, 2974 in number, who are instructed therein cannot be supposed to attend any other schools; at all other places Sunday-school children have opportunity of resorting to other schools also, but in what number, or in what proportion duplicate entry of the same children is thus produced, must remain uncertain. Fifty-one schools, containing 3418 children, which are both daily and Sunday schools, are returned from various places, and duplicate entry is known to be thus far created. Making allowance therefore for this cause, which prevents accuracy, we may perhaps fairly estimate that about two-thirds of the children between the ages of 2 and 15 years are under instruction in this county.

#### Maintenance of Schools.

Description of Schools.	By endowment.		By subscription.		By payments from scholars.		Subscrip- and pay- ment from scholars	
	Schls.	Scho- lars.	Schls.	Scho- lars.	Schls.	Scho- lars.	Schls.	Scho- lars.
Infant Schools . . . . .	7	91	8	523	112	1,353	5	227
Daily Schools . . . . .	111	3,630	56	3,051	345	7,256	32	2,174
Sunday Schools . . . . .	39	2,267	356	34,209	—	—	11	1,876
Total . . . . .	157	5,978	420	27,783	467	8,609	48	4,277

The schools established by Dissenters, included in the above statement, are

	Scholars.
Infant-schools . . . . .	2 containing 84
Daily-schools . . . . .	15 . . . . . 308
Sunday-schools . . . . .	110 . . . . . 8,505

The schools established since 1818 are

	Scholars.
Infant and other daily schools . . . . .	279 containing 8,131
Sunday-schools . . . . .	215 . . . . . 17,245

Twenty-four boarding-schools are included in the number of daily-schools given above. No school in this county appears to be confined to the children of parents of the Established Church, or of any other religious denomination, such exclusion being disclaimed in almost every instance, especially in schools established by Dissenters, with whom are here included Wesleyan Methodists and Roman Catholics.

Lending-libraries of books are attached to 23 schools in this county.

**NORTHCOTE, JAMES**, an English artist and writer on art, was born in 1746, at Plymouth, where his father was a watchmaker. Having been introduced to Sir Joshua Reynolds through Dr. J. Mudge, he went to London at the age of twenty-five to study painting under him, and was for five years not only his pupil but his inmate. This circumstance was of no small advantage to him, as it not only tended to refine his manners, but brought him into contact with the best society of the day. On quitting Reynolds he at first set up as a portrait-painter, and would no doubt have become eminent in that branch of the art, as he possessed much insight into and power of describing individual character. But his ambition prompted him to aspire to something higher than taking likenesses. He accordingly set out for Italy, where he spent about five years, and was made a member of the academies of Florence and Cortona. On his return he was encouraged by Boydell, who published many engravings after subjects painted by him, and among others that called the Village Doctress, which was for a long time an exceedingly popular print. For the Shakspeare Gallery he produced two of his best works, the Murder of the Two Princes in the Tower, and Hubert and Arthur,

besides some other subjects. Yet although he displayed considerable skill in composition and colouring, together with vigour of expression, his ability in art was by no means equal to his enthusiasm and his application. For nearly half a century he existed almost entirely in his painting-room in Argyle Street, and would have been content, as he himself said, to live on so far ever in what was to him all-sufficient enjoyment. In the latter part of his life he was quite a recluse, and independent both in spirit and circumstances—the latter chiefly owing to his prudence and frugality. He was apt to be somewhat cynical, though really kind-hearted. Hazlitt's 'Conversations' with him afford the best portraiture of his character and of the qualities of his mind. His literary productions are far from being inconsiderable. Many papers of his appeared in a work entitled 'The Artist,' and in 1813 he published his 'Memoirs of Sir Joshua Reynolds, with an Analysis of his Discourses,' a quarto volume, to which he afterwards added a supplement. In 1828, at the age of eighty-two, he again appeared as an author, with his 'One Hundred Fables, original and selected,' which, though of little interest as a literary performance, is a book of great attraction on account of the very numerous and exquisite wood-cuts, all which were executed after his own designs, and were superior to any embellishments of the kind that had then appeared. A second set was published after his death, according to his instructions in his will. As if to convince the world that he was not only still living, but unwearied by his long career, he published, in his eighty-fourth year, his 'Life of Titian,' a work which contains much information relative to painting and to art generally. Neither did he lay aside his pencil, but may almost be said to have died with it in his hand, since he continued to amuse himself with it till within a day or two of his death, which happened at his house in Argyle Street, July 13, 1831. Northcote was never married, but lived with his maiden sister, who survived him.

**NORTHUMBERLAND**, a northern county of England. It is bounded on the north by Northumberland and Islandshire, two divisions which constitute a detached part of the county of Durham; on the east by the North Sea or German Ocean; on the south by the county of Durham, from which it is separated in one part by the Tyne, in other parts by the Stanley Burn and the Derwent, feeders of the Tyne; on the south-west by Cumberland, from which in one part it is separated by the Irthing, which flows into the Eden; and on the north-west by the Scotch counties of Berwick and Roxburgh, from the former of which it is in one part separated by the Tweed. Its form, if the small detached part of Durham be taken with it, is triangular, the base, resting on the county of Durham, and the vertex being at the bounds of the town of Berwick. The length of the base, from the mouth of the Tyne to Blacklaw Mountain on the border of Cumberland, is 47 miles; that of the side from the mouth of the Tyne to Berwick bounds, 60 miles; and that of the remaining side, 70 miles. That portion of the district whose form and dimensions are here given which belongs to the county of Durham is very small.

The area of the county of Northumberland is estimated at 1871 square miles; the population in 1821 was 198,965; in 1831, 222,912, showing an increase in ten years of 23,947, or 12 per cent., and giving 119 inhabitants to the square mile. In size it is the fifth of the English counties; in amount of population the twenty-fourth; and in density of population the thirty-eighth.

Newcastle, the county town, is on the Tyne, about 250 miles in a direct line north by west of London, or 278 miles by the mail-road through Ware, Huntingdon, Stamford, Grantham, Newark, Doncaster, York, Thirsk, Northallerton, Darlington, and Durham. [NEWCASTLE.]

**Surface, Geological Structure, and Hydrography.**—Northumberland is a rugged county. The highest hills are on the north-west border, towards Scotland. They are commonly designated the Cheviot Hills, which name is in strictness limited to one group among them. They extend from the neighbourhood of Wooler towards the south-west. The Cheviot Hills, properly so called (2657 feet high), are near the northern extremity. Biers Hugh, Hedgehope (2347 feet high), the Hartside Hills, Standrop, Rowhope, Cawlahope, and many others are near the Cheviot, but more to the southward; Lumsden Hill (725 feet high), Carter Hill, Three Pikes, Tronting Crag, Peel Fell, Granknus, Baron's Pike, and others, are to the southward of these, approaching the Cumberland border. These hills have in several instances a conical

form, and some are nearly perfect cones; they are covered with a fine green turf, and afford excellent pasture for sheep. Another range of hills, nearly parallel to the range just described, extends from the east of the junction of the Till with the Tweed southward to the bank of the Tyne. In the northern part they bear the name of the Divot Hills; in the centre they form the high lands of Eglingham Common, Rothbury Forest, the Simonside Hills (1407 feet high), and Harwood Moor; more to the south are Ottar Caps and Tone Crag. Black Heddon, near the Divot Hills, is 646 feet high. Branches from these hills extend eastward toward the sea; Rufflaw, in one of these branches near Morpeth, is 595 feet high; and Alnwick Moor is 808 feet high. The hills south of the Coquet form part of the extensive moorlands which occupy a third part of the county, and have an average elevation of from 500 to 1000 feet above the level of the sea.

South of the Tyne is a group of hills separating the valleys of the Tyne and the Wear. The Wolf Hills, part of this group, approach the right or east bank of the South Tyne. On the opposite side of the valley of that river are the high lands of Geltsdale Forest, which are partly in this county and partly in Cumberland.

The coast is low. There are no cliffs except very low ones throughout its whole range. From the mouth of the Tweed at Berwick it runs south-east to Sunderland Point. In this part are two bays: the larger, opposite Holy Island; the other, Buddle Bay, into which a little stream, the Warnburn, flows, is more to the south-east. Holy Island and the Farne Islands are noticed elsewhere. [DURHAM.]

From Sunderland Point the coast runs south by east to the mouth of the Tyne. It is marked by some headlands and bays; Beadnell Point, the headland of Dunstanborough Castle, Boulmer Bay, Alnmouth Bay, Hawksley Point, south of which is Druridge Bay, Newbiggin Point, and Seaton Road. Coquet Island lies off Hawksley Point. It is nearly a mile long from north to south, and about half a mile broad. It had formerly a religious house, a cell to Tynemouth; there was also a fortress, the ruins of which have been converted into a dwelling-house and lighthouse. It contains some rich pasture and abounds in rabbits. Coal was dug in Leland's time.

The south-eastern part of the county, bounded by a line drawn from Warkworth, at the mouth of the Coquet, by the head of the river Blyth, to the Tyne, and from thence southward to the bank of the Derwent, is included in the great coal-field of the counties of Northumberland and Durham. [COAL-FIELDS.] This coal-field is skirted on the north-west by a belt of land occupied by the millstone-grit. The thickness of this formation is probably 900 or 1000 feet at least. The prevailing rock of the series is shale, known by the provincial name of plate, with which occur various beds of sandstone, differing in hardness and texture, and, according to these differences, distinguished as freestones, hazles, whetstones, grindstones, and millstones. Beyond the millstone-grit district is a belt of land, still narrower than the foregoing, occupied by the carboniferous or mountain limestone. This is marked in Mr. Greenough's 'Map' as skirting the millstone-grit, from the sea at Alnmouth to the southern border of the county, where it expands over a greater extent, occupying the valley of the Tyne and the country south of it from the border of Cumberland to below Hexham. Nearly all the rest of the county is occupied by a series of formations comprising sandstones of various kinds (one of them resembling the sandstone of the millstone-grit series), limestone, slaty clay, shale, and coal. The relative position of these beds is not ascertained. The coal worked in this formation is slate coal, and is considered inferior in quality to that of the Northumberland and Durham coal-field. Conybeare and Phillips refer these beds to the millstone-grit series.

Trap rocks occur in connection with both coal formations, either as overlying masses, resting unconformably on the subjacent strata; as dykes, irregularly intersecting the strata; or as beds, conformably interstratified and regularly alternating with the other strata. A small district along the Tweed is occupied by the new red-sandstone.

The principal mineral product of this county is pit-coal, of which the chief part raised is sent coastwise to London and to various ports of the southern and eastern counties which do not produce coal. [COAL-FIELDS: COAL TRANS.] The principal pits in the great coal-field are in the neighbourhood of the Tyne.

There are many pits in the millstone-grit and carboniferous limestone districts, and in the inferior coal formation which crops out from beneath them and overspreads so large a portion of the county. Some gypsum is obtained in the red-sandstone district, near the Tweed; and there are lead-mines in the carboniferous limestone at Allendale, near the border of Durham [ALLENDAL], and in other places. The ores of zinc abound in most of the veins producing lead. There is abundance of ironstone in the strata which occur in the coal-measures. Limestone is dug in many parts, and stone for various purposes is quarried in the principal coal-field.

The rivers of Northumberland rise for the most part in the eastern slope of the hills of the north-western boundary, and flow eastward across the county to the German Ocean. The Tweed lies to the west of this range, and belongs chiefly to Scotland. For a short distance however, near Coldstream, it skirts the border of Northumberland and of that detached portion of Durham which adjoins Berwick. The tide flows up to Norham Castle, but vessels of forty or fifty tons get up to New Waterford only, six miles above Berwick.

The Till rises in the eastern slope of the border range, near the Hartside Hills, and, under the name of the Bremish, flows first eastward, then northward; on reaching the neighbourhood of Belford it turns north-west, and, assuming the name of Till, flows into the Tweed. It receives the Roddam Burn and the Lill Burn, and the Beaumont or Glen river, the last from the west side of the hills. The Till is nearly 40 miles long.

The Aln rises at Alnham, near the foot of the border range, and flowing eastward 20 miles past Alnwick, falls into the sea at Alnmouth. The Coquet rises in the border range, and flowing first south-east, then bending to the east past Rothbury, and then flowing again to the north-east, falls into the ocean just below Warkworth, after a course of about 37 miles. The Aln and the Coquet are both navigable for a short distance, the former up to Alnwick. There is a salmon fishery at the mouth of these rivers, and the Aln abounds in trout.

The Wensbeck or Wansbeck rises in the hills which run through the centre of the county, and flows east past Morpeth, where it becomes navigable, into the German Ocean. Its whole length is 24 miles, the length of the navigation 6 miles. The Blyth rises in the same range of hills as the Wensbeck, and has a course of above 20 miles nearly parallel to that river, more to the southward. It is navigable a short distance from the mouth. The Pont is a small stream, flowing into the Blyth. The parish of Bedlington, or 'Bedlingtonshire,' between the mouths of the Wensbeck and the Blyth, belongs to the county of Durham. The Seaton Burn is a short stream, 11 or 12 miles long, to the south of the Blyth, with which it communicates near its source. It flows into the sea at Seaton Sluice, or Hartley new harbour.

The North Tyne rises from several springs, some of which are just within the Scottish border, some in Northumberland but close on the border, and after flowing southward under the name of the Keelder Burn for 10 miles, turns eastward and flows 14 miles to just below Bellingham, where it receives the river Reed from the border of the county, 22 miles long; from this point the stream flows south-east 14 miles to the junction of the South Tyne, just above Hexham. The South Tyne rises amid the hills south of Aldstone Moor in Cumberland, and after flowing 17 miles northward to Haltwhistle, turns eastward and flows 16 miles to its junction with the North Tyne. It receives the Allen and some other small streams. The united stream flows in a tolerably direct eastward course of 30 miles, past Newcastle into the sea between North and South Shields. Its whole length from the head of the North Tyne is about 70 miles. It is navigable for sea-borne vessels up to Newcastle, and for river craft a few miles higher. The salmon fishery on this river was formerly celebrated, but is now nearly if not quite destroyed. The spring-tides rise about 18 feet at the mouth of the river and about 11½ feet at Newcastle.

The salmon fishery of the Tweed is very important, and a considerable number of boxes of that fish packed in ice are sent from that river to the London market, beside what is pickled or dried. There is a fishery for salmon-trout and grilse, or small salmon, at Warkworth on the Coquet.

The vale of the Coquet is noted for the excellence of its agriculture; the vale of Tyne exhibits great variety of scenery; above Newcastle it is rich and beautiful.

There are no canals in Northumberland, but there are many railroads. The most important is the Newcastle and Carlisle Railroad. It follows the valley of the Tyne and South Tyne, partly on the south, partly on the north side of the river, and passes by Hexham and Haltwhistle. Its whole length is about 60 miles, the greater part in this county. The Act was obtained in 1829 and the railway was opened in June, 1838. The number of passengers who travelled by this railroad in 1838 was 196,051. A railway from Newcastle to North Shields, above seven miles long, was opened in 1839. It is 6½ miles long, and passes under the Shields road by a tunnel 70 yards long. The number of passengers by this railroad averages nearly 2500 daily. The Brandling Junction Railway, which unites Gateshead with South Shields and Monk Wearmouth, was also opened in 1839. Most of the other railways are short, and serve for the conveyance of coal from the different pits to the Tyne, the Blyth, the Aln, and the Tweed. Two railroads from Newcastle to Edinburgh have been projected, one near the coast by Morpeth, Alnwick, and Berwick-upon-Tweed; the other, more inland, following the valley of the Reed near Otterburn. The Great North of England Railway is to unite York with Newcastle, or rather with Gateshead on the south bank of the Tyne, opposite Newcastle. The Gateshead and Durham Railway, for which an act has been obtained, forms part of this line.

The Edinburgh mail-coach road enters the county at Newcastle, and runs northward through Morpeth, Alnwick, and Belford, to Berwick-upon-Tweed. Another road to Edinburgh branches off from this beyond Morpeth, and runs by Wooler to Coldstream. A third road to Edinburgh runs from Newcastle by the valley of the Reed to Jedburgh. The coach-road from Newcastle to Carlisle runs by Hexham and Haltwhistle.

*Agriculture.*—The position of this county, in the north-eastern extremity of England and along the coast of the German Ocean for upwards of sixty miles, causes the climate to be considerably colder and the harvest later than in the southern and midland counties. In that part of the county which skirts the sea-shore, although it is exposed to cold easterly winds, the air is much milder and more genial than in the western and mountainous part, which, although too high and bleak for cultivation, beyond a certain elevation, produces sufficient herbage to maintain large flocks of hardy sheep, known by the appellation of the Cheviot breed.

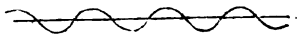
Along the coast and for some miles inland the soil consists of a strong fertile clayey loam well adapted to the growth of wheat, beans, and clover, and there are some excellent natural meadows and pastures.

Along the banks of the Tyne and the Coquet, and along the Aln from Alnwick to the sea, the soil is chiefly a light gravel, sand, or dry loam, which is likewise the case to a great degree in the vales of the Beamish, Till, and Beaumont. In the middle and south-eastern parts of the county the soil is a moist loam on a cold impervious clay bottom, which is of inferior value until it has been improved by draining and careful cultivation. In its natural state it produces inferior pasture unfit for sheep, which are subject to the rot when turned out upon it, but it is better adapted for young cattle, which may be reared but not fattened on it. On the hills, which are in a state of nature, there is a mixture of low peat-bogs, stony and gravelly heaths, and some good dry green pasture well adapted for sheep feed.

The county of Northumberland has been one of the foremost of the English counties in adopting the improved system of agriculture, the chief feature of which is the cultivation of turnips for the rearing and fattening of cattle. Turnips accordingly occupy a large proportion of every farm the soil of which admits of this cultivation. So great has been the advantage derived from this change from the old triennial system, that many fields now yield heavy crops of this useful root which in most other parts of England would be considered as totally unfit for its cultivation. This has arisen from the early adoption of the culture in rows on elevated ridges, which has received the general appellation of the Northumberland method, and which we shall therefore describe with some minuteness.

The ground having been prepared by as many ploughings and harrowings as may be thought requisite to pulverise it and destroy the weeds, and laid quite flat, an experienced ploughman draws as straight a furrow as possible and returning lays the next furrow slice upon the first, thus completing what is usually called a *bout*. The usual width of

the furrow being nine inches, the first ridge and furrow take up 18 inches; the next furrow slice being laid over the first, the whole work takes a width of 27 inches. He then enters again at the distance of 27 inches from the land side of the first-made furrow, and completes a second bout parallel to the first. When the whole field is thus laid into narrow ridges, which, from the soil being light and crumbling, gives the section of the surface a waved appearance, such as



is represented in the annexed cut, the depressions are about 6 inches below the former surface and the ridges as much above. This at once doubles the depth of the cultivated soil in the ridges. The manure is now brought on the land in small one-horse carts, the wheels of which are about 54 inches apart, so that the horse walks in one furrow while the wheels move in the two adjoining. The manure, which is chiefly common farm-yard dung, not too much decomposed, especially if the soil is inclined to clay, is laid in small heaps, drawn out of the cart by a dung-hook, or, which is better, by a boy standing on the load in the cart, who forks it out more regularly as the horse goes slowly on. It is then laid equally in the furrows by women and boys. The quantity thus laid on, depends on the supply of the yard compared with the breadth of turnips intended to be sown, for the whole is expended on this crop. In general, not less than 15 or 20 single-horse loads per acre are thought necessary to produce a good crop. Twice that quantity is often put on. This dung is evenly distributed in the furrows to the right and left of that in which it has been deposited from the cart. The ploughman now begins to cover this dung by splitting the ridges in two, laying one half to the left and the other to the right, and reversing the bouts, so that the ridges are now directly over the dung, which is completely buried. The appearance of the field after this is exactly similar to what it was after the first bout. A roller is now drawn over the ridges, to flatten them at top, in order that they may better receive the seed, which is drilled exactly on the middle of the ridge by a machine attached to the frame of the roller and dragged after it. The roller is usually sufficiently large to roll two ridges at once, and, in that case, two drilling-machines, each guided by a man, are fixed to it, and one horse, walking in the middle furrow, draws the whole apparatus forward. Thus, two men and a horse, with a boy to lead the latter, can drill four or five acres in one summer's day. The drill barrow has a very slight coulter, hollowed out at the back part to receive the tin tube through which the seed is delivered. The simplest construction of that part which distributes the seed is a tin cylinder, or rather double cone, with holes in the circumference, through which the seed falls into the tube. The seed-box revolves on an axis turned by means of a connection with the axis of one of the wheels of the machine, which revolves with it; the other wheel turns round this axis. As long as the first-mentioned wheel goes on the ground the seed is delivered, but as soon as it is raised, so that the drill proceeds on the other wheel alone, no seed falls through, because the axis no longer turns. Thus none is lost in turning at the ends of the ridges. In very light soils another slight rolling is necessary to press in the seed; but in stiffer loams a small chain or piece of iron dragged after the coulter is sufficient to cover the seed, without rolling. By this method the seed has not only a greater depth of mellow soil to strike in, but the fermentation of the dung immediately under it acts as a hot-bed and soon brings it up; by which means it generally is so rapidly in the rough leaf, that it seldom suffers from the depredations of the fly. Experience shows that in a moist climate the ridge system produces much more certain and heavier crops than could be expected in general from the most careful broad-cast culture. As soon as the turnip has four leaves out of the ground, the rows may be thinned by the hand or by the hoe, and the plants may be left from eight to ten inches apart. The next process is stirring the ground between the rows with a light one-horse plough. This plough takes a small shallow furrow to the left of the row, within three or four inches of the young plants, and lays it in the middle of the interval between the ridges. When this has been done on both sides all over the field, there will be small ridges formed between the principal ridges on which the turnips grow. All weeds are thus buried, except between the plants in the rows; where they are taken out by the hand or hoe.

Some time afterwards a narrow cultivator, like harrows with crooked tines, which are called *cats' claws* from their shape, is drawn over the last-made ridge to pulverise the earth and clear it from all remaining weeds; this is repeated more than once, if it should be thought necessary. Before the autumn rains set in, or the turnips have too wide spreading tops, a plough with a double mould-board is drawn along the middle of the intervals, and lays half of the pulverised soil on each side against the ridge on which the turnips grow; not to cover the roots and protect them from frost, as some think, but to supply fresh mellow earth for the extending fibres of the root to strike into. In heavy wet loams it may be necessary, in order to make a clean neat furrow between the rows, to let off any surface water, in the latter end of the season with a double mould-board plough, and dig out deeper water-furrows with the spade across the ridges, where they may be required by the nature of the surface. But this is not often necessary in common turnip soils. By following the above system, Swedish turnips and even common white turnips may be raised with success on the heaviest soils; and if taken up early, and stored for winter use, they will leave the land in as good a state for wheat, with one or two ploughings, as if it had been fallowed. The carts which take off the turnips will not hurt the land, for the horse walks in a deep furrow, and the wheels move in similar ones, and thus the mellow earth is not trod upon. In order that the dung, which is not yet fully decomposed, may be spread evenly for the next crop, the ridges are often made in a diagonal line across the usual line of ploughing. When the turnips are off, one bout of the plough levels each of the ridges, heavy harrows level the whole, and it can be ploughed in proper stitches for the sowing of the next crop. Sometimes wheat is sown immediately, but more frequently barley with clover-seed in spring. In the latter case the Swedish turnips may be left on the ground all winter, and taken up or fed off early in spring.

Though you may traverse the whole of Northumberland without meeting with a single field of turnips sown broadcast, the drilling of other crops is by no means so common as in Norfolk and Suffolk, where most of the turnips, on the other hand, are still sown broadcast. The expense of the machines for drilling corn may be one cause of this, but it seems not sufficient to account for it.

It is well known to all good farmers that all the subsequent crops depend on the success of the turnips. These are the source from which manure is provided, and no crop will keep so much cattle during winter and early spring, with so little exhaustion of the soil, as turnips. The manure abundantly put on the land to raise the turnips is a fund laid out at great interest for the benefit of the future crops; for the whole course is benefited by them, especially if they are fed off by folding sheep on them. Whether wheat or barley is sown after turnips, clover and grass-seeds are usually sown amongst it. The land being clean and in good heart, the grasses grow thickly and cover the ground well the year after. In the heavier loams, after the grasses have been once mown for hay, the land is depastured for two or three years, and then it is ploughed once and sown with oats. After oats come beans, with some manure, and wheat ends the rotation. This is considered the best course for keeping the land in a state of progressive improvement. On very rich soils another crop of beans or peas may be taken after the wheat, and then wheat or oats again. Few soils however, except the richest and deepest, will bear this exhausting course; and it is more prudent in general to return to the turnips after the first crop of wheat.

On light gravelly soils, where the clover and grasses soon fall off, the Norfolk system answers best. The turnips are fed off with sheep, or, where the crop is heavy, half the turnips are drawn for oxen and cows, and the other half fed off; or, which is a late improvement, they are cut into slices or strips by a machine, and given to the sheep with cut clover-hay in shallow troughs on the ground from which the turnips were drawn. In this way the turnips go much farther; and lambs and old ewes will thrive and fatten on them, which they could not have done in the old way for want of teeth to bite them. After turnips come barley and broad clover, with a small portion of annual rye-grass, mown once for hay and ploughed up for wheat. The next course is the same, with the variation of some substitute for the broad clover, which should not be sown on the same land oftener than once in eight years to ensure good crops. Part

of the land may be in peas or tares to cut green, and part in grass-seeds without clover, according to the judgment of the farmer. There are some very heavy and wet soils in the county, which will not readily bear turnips, and where the sheep cannot be folded in winter, nor the turnips carted off without greatly injuring the land. There a fallow is unavoidable at least once in six or seven years. In other respects they are cultivated in a similar manner with the good loams. The practice of thorough draining, which is spreading rapidly, will probably soon banish clean fallows, and substitute turnips in their place, even in the most retentive soils, which will in time be converted into rich loams by the effect of cultivation, loaming, manuring, &c., as may be seen in many old gardens, of which the natural soil was once a retentive clay.

Potatoes are raised to a considerable amount on some very good sands and loams. They require land in good heart; for whatever may have been said or written to the contrary, they very much exhaust the land, and should not be repeated oftener than once in ten or twelve years on the same spot. The best land to plant potatoes in for human food is that which is broken up from two or three years' old grass. For cattle they may occupy a portion of the turnip-field, and be cultivated in similar ridges, with this difference, that the sets, or cut potatoes, are put immediately on the manure in the furrow, and covered over with four or five inches of earth by the plough. As they rise out of the ground they are moulded up by the plough; and this is repeated, with a plough made on purpose, with two very wide mould-boards, as often and as deep as the soil will allow. Thus 400 bushels, or twenty tons, of the large cattle-potatoes may be raised on an acre of good land: they are good for every kind of stock when boiled or steamed. Although the immediate profit in this way is much inferior to that of a smaller crop of more edible potatoes, sold in the market, the manure produced amply makes up for the difference, unless potatoes sell at a high price, as is the case near manufacturing towns.

The instruments of tillage are mostly of improved make. The ploughs are generally iron swing-ploughs, on the principle of the old Rotherham plough, which was copied from the Belgian plough, and improved by Small and others. The harrows, rollers, scarifiers, &c. are as in other counties. The turnip-drill has been described, and there are various improvements daily made in the construction. The best sows two rows at once, and has a roller before and one behind, thus combining all the necessary operations connected with the depositing of the seed. Single-horse carts are more common than any others, and used for all purposes, especially the conveyance of lime and other manures from a distance. Bones ground to a moderate size are now extensively used as a manure for turnips, especially on dry gravelly soils; and they have greatly improved all the crops, by securing that of the turnips, at a much less expense of farm-yard dung. Threshing-machines, moved by water, wind, or horses, are thought essential on the larger Northumberland farms; and there is no prejudice against them amongst the labourers, but on the contrary. The labourers are industrious and honest: they are mostly paid partly in grain, by the keep of a cow, and a cottage rent-free, with other advantages. [BERWICKSHIRE.] The unmarried servants are boarded on the farm, as in Scotland.

There are not many meadows, properly so called, in Northumberland, and few are artificially irrigated. Some rich upland pastures are mown annually, or every two or three years, for hay, and fed off the remainder of the time. Some are occasionally invigorated with manure, chiefly composts of earth, lime, and dung, well mixed and incorporated, which is put on in winter, when farm-work is slack, or, which is better, immediately after the hay is taken off, when it is soon washed in by the autumn rains. The hay produced from clover and artificial grasses, of which there is a considerable quantity on all well-managed farms, furnishes the great supply of winter fodder for horses, and is a useful addition to the turnips for feeding cattle.

The cattle in Northumberland are generally of good breeds, mostly short-horned. Those bought to fatten are chiefly Scotch. In noticing the cattle of this county we cannot pass over the wild breed, in the earl of Tankerville's park at Chillingham. They are mere objects of curiosity, never having been made useful for farming purposes: nor does it appear that they have been used with any advantage crossing with domesticated breeds. They are of a light

cream colour, with black muzzles. Their flesh is said to be good and succulent, when they are killed in condition, which must be done by shooting them like deer. The cows kept for the dairy are almost invariably of the short-horned Durham breed; and many remarkably fine heifers are reared in the county, some of which travel southward and supply the large dairies of the London milkmen. The calves are reared on milk at first, gradually mixed with water and meal, till they can live on grass alone and run in the pastures. The first winter they have turnips and straw, and are often sold in calf and in good condition the ensuing autumn. If they are kept over the second winter, they have the same food as in the first, with the addition of a little hay occasionally. They are then kept for private use as dairy cows, or sold with their young calf soon after calving, which is generally in April or May. Great attention is paid by some breeders to have a good bull; and very high prices are given for the use of one of a good breed and with good points for one season. The breeding of bulls is a separate business, and requires much experience and judgment.

Excellent farm-horses are bred in Northumberland. They are active, with clean legs, and are very muscular and hardy. Four fat horses in a plough or team, such as are seen in Kent, would be a curiosity in the northern counties. They like fat bullocks, but prefer hard wiry sinews in horses. It is not often that a plough is seen with more than two horses yoked to it, and this only for trench or sub-soil ploughing, a practice which is beginning to gain ground, as the next improvement after complete draining. The horses are not permitted to be idle. The example of those who work in the collieries teaches the farmer what horses can do: and if they are worked harder than in the south, they have a larger quantity of corn given them. A horse in a single cart will go to a distance of 18 or 20 miles for lime or coals, and return in the 24 hours; and this he will do four times, and even oftener, every week. It is no wonder that they carry no unnecessary fat about them.

The sheep are chiefly of the native Cheviot breed, a useful hardy sheep with a small fleece of moderate wool. A cross between a Cheviot ewe and a long-wooled ram is said to produce a useful breed improved in the carcass and in the bulk if not the fineness of the fleece. On highly improved farms the Leicester and South down breeds and almost every other may be found: but as many of the pastures are wet, and apt to cause rot in the sheep at particular seasons, most farmers buy them in to eat their turnips, and sell them off when fit for the market, before there is any fear of their being tainted.

The Cheviot sheep are described as follows. They have a fine open countenance with lively prominent eyes, a long body with a want of breadth at the chine and breast. They have fine clean legs without wool on them, and when fat their carcass will weigh from six to eight stones of 8lbs. the stone. The fleece is from 2½lbs. to 3½lbs. weight, of a mixed wool, which might probably be much improved by care in selecting the ewes and rams kept for breeding, as was done with the South-down sheep by Ellman in Sussex. Some pains have already been taken to improve the breed, and with good results. The principal farms in Northumberland are let on lease for 21 years to highly respectable tenants with sufficient capital. No more need be said to account for a high state of cultivation.

There are no very extensive old woods in the county, but many thriving plantations; there is a constant demand for small timber for the use of the coal-mines, which makes it profitable to cut young saplings, and the trees are not often permitted to acquire the size of large timber. The larch is a profitable and favourite tree in all young plantations, and thrives well in most situations, from the sides of the rivers to near the tops of the highest hills.

The following fairs are the principal in which cattle or agricultural produce is sold:—

Allentown, May 10, November 14, horned cattle; Alnwick, May 12, last Monday in July, first Tuesday in October, 28th of October, ditto; Belford, Tuesday before Whit-Sunday, August 23, black cattle, sheep and horses; Berwick, Friday in Trinity week, black cattle and horses; Billingham, Saturday after Sept. 15, horned cattle and sheep; Elledon, August 26, ditto; Haltwistle, May 14, November 22, horned cattle; Harbottle near Rothbury, September 9, ditto; Hexham, August 5, November 8, horned cattle, sheep, hogs; Morpeth, Wednesday, Thursday, Friday so'night before Whit-Sunday—Wednesday, horned cattle



Thursday, sheep; Friday, horses; Newcastle, August 12 and October 29, nine days each, horned cattle, sheep, hogs; North Shields, last Friday in April, first Friday in November, cattle; Ovingham, April 26, swine, fat and lean; Rothbury, Friday in Easter week, Whit-Monday, October 2, All Saints, November 1, horned cattle; St. Ninian near Fenton, July 14, hogs, September 27, black cattle and sheep; Stagshawbank, Whitsun-eve, horned cattle, horses, sheep, July 4, hogs; Tynemouth, first Tuesday in July, Warkworth near Alnwick, Old Michaelmas, if a Thursday, if not Thursday before, November 22, horned cattle; Wheelwood-bank near Wooler, Whit-Tuesday, black cattle, sheep, horses; Whittingham, August 24, black cattle, horses; Wooler, May 4, October 17, cattle, horses, sheep.

*Divisions, Towns, &c.*—Northumberland is divided into six wards, as follows:—

Wards, &c.	Situation.	Acres.	Pop. in 1831.
Bamborough	N.E.	69,650	10,842
Castle	S.E.	103,680	71,533
Coquetdale	Central	269,590	21,121
Glendale	N.W.	107,200	12,009
Morpeth	Central	93,530	13,312
Tindale, or Tynedale	S.W.	514,660	42,415
Newcastle, town and county		2,000	42,760
of the town		5,120	8,920
Berwick-upon-Tweed			
		1,165,430	222,912

It contains the assize town of Newcastle, the parliamentary and municipal borough of Morpeth, and the new parliamentary borough of Tynemouth and North Shields, and the market-towns of Alledale, Alnwick, Belford, Bellingham, Haltwhistle, Hexham, Rothbury, and Wooler. To which may be added, as places of some importance, though without markets, Alnmouth, Bamborough, Blyth, Hartley, Seaton, and Warkworth. Of these some are noticed in separate articles: ALLEDALE (pop. 5540); ALNICK (pop. 6788); BAMBOROUGH (pop. 478); BLYTH (pop. 1769); MORPETH (pop. 3890); NEWCASTLE (pop. 42,760); TYNEMOUTH (pop. 23,266); of the rest we subjoin an account.

Belford is in the northern division of Bamborough ward, on the Edinburgh mail-road, 4½ miles from Newcastle, and 322 from London. The entire parish comprehends 9380 acres (with a population, in 1831, of 2030 inhabitants), and extends into Islandshire, a part of Durham; the township of Belford contained, in 1831, a population of 1354, about one-fourth agricultural. The town stands on a gradual slope about two miles from the sea. It consists of two principal streets; the houses are in general neat and well built. The church, or chapel, is an irregular building capable of containing 600 or 700 persons; there are two or three dissenting places of worship. There is a little weaving done; and several of the townsmen are employed in stone-quarries and coal-pits near the town. There is a market on Tuesday, at which a considerable quantity of corn is sold for exportation, and there are two small cattle-fairs in the year.

The living a perpetual curacy, of the clear yearly value of 147*l.*, with a glebe-house. There were, in 1833, in the township of Belford, five day-schools, with 181 children; three boarding-schools, with 26 children; and two Sunday-schools, with from 80 to 140 children. In the other townships of the parish were three day-schools, with 102 children, and one Sunday-school, with 42 children.

Bellingham is in north-west division of Tindale ward, 16 miles north-north-west of Hexham, and 294 from London. The parish (one of those formed by the division of Simonburn parish, A.D. 1811) comprehends the township of Bellingham, and the 'quarters' of East Charlton, West Charlton, Leemailing, the Nook, and Tarretburn, with an aggregate area of 15,540 acres, and a population, in 1831, of 1460, of whom 464 were in the town of Bellingham. The town is pleasantly situated on a declivity on the left bank of the North Tyne, and comprehended, in 1831, only 82 inhabited houses. The chapel is a small antient building with a finely groined stone roof. There are a Catholic chapel and a Burgher meeting-house. A few hands are engaged in manufacture. There is a small weekly market on Saturday; and two yearly fairs, one of them a small cattle-fair. The living is a rectory, of the clear yearly value of 194*l.*, with a glebe-house. There were in the township, in 1833, two day-schools (one of them with a small endowment), with 67 children; and in the other quarters of the parish five day-schools, with 105 children.

P. C., No. 1016.

Haltwhistle, is in the west division of Tindale ward, 285 miles from London. The parish contains 52,930 acres, and is divided into thirteen townships. The population of the whole parish, in 1831, was 4119; that of Haltwhistle township, 1018. The town is on an eminence on the northern bank of the South Tyne, and consists of one principal street, running east and west along the road from Newcastle by Hexham to Carlisle, and of some smaller streets; the streets are neither paved nor lighted. The Haltwhistle Burn, a small stream from the north, passes the east end of the town in its course to the Tyne. The houses are poor and irregularly built. At the east end of the town is an eminence, called the Castle Banks, on which are some rude fortifications of earth of unascertained origin.

The only manufacture carried on is that of baize. There are a small market on Thursday, and two yearly fairs, chiefly for cattle. There are many coal-pits in the parish, in which 100 men are employed, besides boys. The living is a vicarage, of the clear yearly value of 593*l.*, with a glebe-house. There were in Haltwhistle township, in 1833, one endowed and three other day-schools, with 183 children, and one Sunday-school, with 143 children. In the rest of the parish there were eight day-schools, with 215 children, and three Sunday-schools, with 164 children.

Hexham is in the south division of Tindale ward, 278½ from London. The parish comprehends Hexham township, 4310 acres, with a population, in 1831, of 4666; and Hexhamshire, 24,060 acres, with a population, in 1831, of 1376; together, 28,370 acres, population 6042. Hexham is believed to have been a Roman station. Camden conjectured that it was Axelodunum, one of the stations of the 'Notitia,' on the line of the wall (*per lineam valli*), which later antiquaries fix near Carlisle; Horsley contended for its being the Epiacum ('*Επιακον*') of Ptolemy, a town of the Brigantes, which others fix at Lanchester.

Two inscriptions on stones in the vaults of the antient church are considered as proofs that a Roman station did exist here. In the seventh century (A.D. 674) a monastery was founded here by St. Wilfrid, who erected the monastic buildings in a style of magnificence little known at that day. He built also three churches in Hexhamshire, which domain had been granted to him by the queen of Northumbria. A few years afterwards (about A.D. 678), on the division of the Northumbrian diocese into three parts, a bishop's see was established at Hexham, and continued for many years, until the bishops were driven out by the Danes, and the diocese was afterwards united to Lindisfarne. The abbey and town of Hexham were sacked by the Danes early in the ninth century; and in A.D. 875 it was again attacked, the church burnt, and the inhabitants massacred.

In the twelfth century the archbishop of York established here a priory of regular canons of St. Austin, and bestowed on them the former cathedral, and many other gifts (A.D. 1112). In the Scotch wars of Edward I. the town and part of the church were burnt, and the title-deeds of the priory lost; but by royal authority an inquisition was taken (A.D. 1297), and their various gifts confirmed by charter. The revenue of the priory, at the dissolution, was 138*l.* 1*s.* 9*d.* gross, or 122*l.* 11*s.* 1*d.* clear.

The town is pleasantly situated on an eminence, near the south or right bank of the Tyne, a little below the junction of the North and South Tyne. It consists of several streets, the principal of which are tolerably wide, but the rest are generally narrow; the streets are partially paved and indifferently lighted. The market-place is a spacious square, tolerably well paved, and surrounded with pretty good houses; on the south side of the market-place is a market-house, furnished with piazzas; part of it is appropriated as a butter and poultry market, and part to stalls for butchers' meat; at one end of the building is a 'pant,' or reservoir, the water to which is conveyed by pipes. In the market-place is an antient stone building, with a dial in front, formerly used as the town-hall of the bishops and priors of Hexham, and now used as a sessions-house. There are a bridge over the Tyne of nine principal arches, and three supplementary arches to allow passage to the waters in time of floods; a suspension-bridge over the South Tyne, near the town; and a bridge with two arches over a burn west of the town. On the top of the hill on which the town stands, not very far from the town-hall, is a square tower, used as a prison by the bishops of Hexham. But the most important building is the old priory church, now used as a parish church. It is a cruciform building

with a central tower, above 100 feet high to the battlements, or 125 feet high to the top of the vane. The nave, burnt by the Scots in the time of Edward I., has never been rebuilt; the transepts are separated from the choir by a screen richly carved in the lower part and adorned in the upper part by an emblematical painting. The choir is separated from its side aisles by massive clustered pillars supporting pointed arches; above these is the second tier of arches, of Norman character, separated by massive clustered columns; and above these again, a third tier of arches, pointed, supporting the wooden roof. There is a fine east window, and in the church are several antient monuments. There is an antient crypt, which some have supposed to be part of the original Saxon church built by Wilfrid. At the west end of the church are the remains of the monastic buildings; the refectory is yet entire, and is occasionally used as a room of entertainment; it is very spacious, and has an oak roof. There are some remains of the cloisters, which show the richness and excellence of their architecture. The gateway of the abbey, supposed by many to be Saxon, is also standing. There are two Catholic chapels, a Scotch church, and two or three other dissenting places of worship in the parish.

Several manufactures and branches of trade are carried on,—spinning woollen yarn, hat-making, tanning, leather-dressing, and glove-making. The market is on Tuesday for corn and provisions; and there is a Saturday market for butchers' meat. A market for cattle is held on the alternate Tuesdays during a considerable part of the year. There are two yearly markets for horses, cattle, sheep, and swine: at the earlier of these, held in August, vast quantities of lambs are sold. The Midsummer sessions for the county are held here, and petty-sessions for the ward every month. In the western part of the town is a house of correction for the county.

The living is a perpetual curacy, of the clear yearly value of 139*l.*, in the peculiar jurisdiction of the archbishop of York.

There were, in 1833, a grammar-school, with a small endowment and 65 scholars; a school, partly supported by subscription, with 230 children; seven other day-schools, with 200 scholars; and six Sunday-schools, with about 705 children.

Rothbury is in the west division of Coquetdale ward, 304 miles from London. The parish comprehends 33,170 acres, and is divided into twenty-four townships; the population in 1831 was 2869; that of the township of Rothbury, 1014. This place is delightfully situated in a retired spot on the north or left bank of the Coquet. On the north and east it is sheltered by hills; on the west, the valley in which the town stands presents a fine prospect. Rothbury consists of three streets, wide, airy, and lined with tolerably well-built houses. The market-place contains a cross. The church, which is very antient and was formerly larger than at present, is in the form of a cross. The interior is neat and spacious, and contains an antient font and several monuments. Near the church is a school-house. The river Coquet, on the south side of the town, is crossed by a stone bridge of three arches, and on the opposite side of the river is Whifton Tower, one of the antient borderers' houses, now converted into the rectory and surrounded with plantations. Rothbury is frequented in summer by invalids, who come here to drink goats' whey and enjoy the healthy and bracing air of the place.

There is a market for provisions on Friday; there are four yearly fairs, one of them a statute fair for hiring servants, and two of them cattle-fairs. The living is a rectory, of the clear yearly value of 1106*l.*, with a glebe-house. There were in 1833, in the township, an endowed grammar-school, with 65 boys; another endowed school, with 45 girls; and three other day-schools, with 65 children. In other parts of the parish there were one endowed school, with 46 children; another school, partly supported by contribution or endowment, with 25 children; and two other day-schools, with 92 children.

Wooler is in the east division of Glendale ward, 320 miles from London. The area of the parish is 4620 acres, and it had in 1831 a population of 1926. The town consists of a number of streets and lanes, with the market-place in the centre. The country round is well cultivated, but the town is ill paved and the houses are mean: The church is a neat building, erected about the middle of the last century: there are several dissenting places of worship.

The market is on Thursday, chiefly for corn; there are two yearly fairs in the town; the latter, which is held in October, is a great sheep-fair. There are also a large sheep and cattle fair in September at Fenton in the parish; and a large cattle and sheep fair at Westwood bank, near the town, on Whit-Tuesday. The living is a vicarage, of the clear yearly value of 478*l.*, with a glebe-house. There were, in 1833, a grammar-school, partly supported by contributions, with 56 children; a school of industry, supported by subscription, with 32 girls; ten other day-schools, with 259 children; and five Sunday-schools, with 324 children.

There are several entrenchments and cairns near Wooler, and the thick walls of an antient tower, probably of Norman origin, and erected for the purposes of border warfare. On a hill called Humbleton Hugh, about a mile from the town, is a circular entrenchment, with a large cairn; and on the side of the hill are a number of terraces rising one above another, the origin and purpose of which have excited much conjecture. In the plain beneath this hill is a stone pillar, commemorative of the battle of Humbleton, fought A.D. 1402.

Alnemouth or Alemouth is in the parish of Lesbury, and in the south division of Bamborough ward, 313 miles from London. The area of Lesbury parish is 4540 acres; the inhabitants, in 1831, were 976, of whom 415 were in Alnemouth township. This place may be considered as the port of Alnwick: there is a considerable export of corn as well as of other agricultural produce to the metropolis, and of wool to the manufacturing districts of Yorkshire. The harbour is inconvenient, but is capable of much improvement. Some little business is done in ship-building, and a few of the inhabitants are engaged in fishing. On an eminence at the mouth of the Alne, insulated at high-water, is an old burial-ground, in which are the ruins of a chapel. Enormous bones have been dug up in or near this burial-ground, and several stone coffins have been found. Lesbury is a village between Alnwick and Alnemouth: it contains nothing remarkable. The living is a vicarage, of the clear yearly value of 269*l.*, with a glebe-house. There were, in 1833, in Alnemouth township, two day-schools (one chiefly supported by private benevolence), with 78 children, and one Sunday-school, with 50 children; and in the rest of the parish, two day-schools (one endowed), with 96 children; a sewing-school, with 15 children; and two Sunday-schools, with 114 children.

Hartley is in Earsdon parish and in Castle ward, 10 miles north-east of Newcastle. Seaton Sluice is in the township of Hartley, about a mile to the north of the town. The area of Earsdon parish is 11,060 acres: the population, in 1831, was 6460; that of Hartley township, one of eight townships into which the parish is divided, was 1850. Sir Ralph Delaval, in the time of Charles II., constructed a haven at the mouth of the Seaton Burn, which flows into the sea in this township; and in order to prevent the harbour being filled up with mud and sand, he formed a sluice, with flood-gates, to scour the haven. This haven was improved by the late Lord Delaval, who made a new entrance by a cut through the solid rock. This improvement has rendered the harbour accessible at all times and in every state of the wind: it is capable of holding twelve or fifteen vessels of 300 tons, which can ride in safety, and enter or leave the harbour fully laden. The principal trade of the place is in the coals dug from the collieries of the parish, in which nearly 500 men are employed. There is a drawbridge over the new entrance to the harbour. There are in the township three glass-houses for the manufacture of bottles, some malt-kilns, and a brewery. There are Presbyterian and Methodist meeting-houses. Nearly opposite Hartley town is a small island, called St. Mary or Bates's Island, on which formerly stood a chapel and a hermitage. There were in the township, in 1831, three day-schools, with 154 children, and one Sunday-school, with 180 children.

Warkworth is in the east division of Morpeth hundred, about 306 or 308 miles from London. The parish has an area of 16,110 acres, divided into eighteen townships: the population of Warkworth township, in 1831, was 614; that of the whole parish 2478. The town is on the south side of the river Coquet. There are a number of good houses, the place being, from the cheapness of provisions and other necessities, considered a desirable place of residence. The church is an elegant and spacious building, part of it of considerable antiquity; the tower and spire are above 100 feet high. There are places of worship for Me-

thodists and Presbyterians. Immediately adjacent to the town is the antient castle, held at different periods by the descendants of Roger FitzRichard, and by the families of Raby and Percy, to the latter of which it still belongs. It is a noble pile, finely situated on an eminence above the river Coquet. The keep is an octagon, having a projecting tower in the middle of the four principal faces. The entrance is by a flight of steps in the tower on the south face. The whole building is very large, and comprehends many apartments. The great baronial hall is nearly 40 feet long by 24 wide, and 20 high; and there is another state-room of rather smaller dimensions. Just within the entrance, on the ground-floor, are eight apartments with vaulted roofs of stone, supposed to have been designed for the cattle which might be brought into the castle for protection against the inroads of the Scotch borderers. The masonry of the castle is in excellent preservation, but the roof, windows, and floors are for the most part gone. The outer walls of the castle are in many places entire; where they are so, they are 35 feet high. The gateway was a stately building, with apartments for many of the officers of the castle, but only a portion of it now remains. A mound of earth across the moat, which surrounds the whole and encloses an area of five acres, has taken the place of the antient drawbridge. Some other parts of the castle yet remain. The period at which this structure was built is not ascertained. The view from it is very extensive and beautiful. There is a bridge of two spacious arches over the Coquet at the north side of the town, having a tower at the south or town end, with an archway through which the road passes: in the middle of the bridge is a stone pillar, with the Percy arms carved on it. In the perpendicular rocks which form the north bank of the Coquet, about a mile above the bridge, is a hermitage, consisting of two apartments hewn out of the rock, with a lower and outward apartment of masonry, built up against the side of the rock, which rises about 20 feet high. The principal apartment, or chapel, is about 18 feet long, 7½ feet wide, and 7½ feet high, adorned with pilasters, from which spring the groins of the roof: at the east end is an altar, with a niche behind it for a crucifix; and near the altar is a cavity containing a cenotaph, with a recumbent female figure having the hands raised in the attitude of prayer. In the inner apartment are another altar and a niche for a couch. From this inner apartment was a door leading to an open gallery or cloister. Steps led up from the hermitage to the hermit's garden at the top of the bank. This hermitage, it has been supposed, was the abode of one of the Bertram family, who spent here a life of penitence for the murder of his brother: the Percy family, after his death, maintained a chantry priest here. There is no record to show the date of this foundation. There are several good shops in the town. There is a yearly fair in November for fat cattle and winter stock. There is a fishery of salmon and salmon trout (especially the latter) in the river. Warkworth is a borough by prescription: the principal officer is the boroughreeve or mayor. The parish yields excellent coal, freestone, limestone, and whinstone: valuable pebbles are sometimes found in the river. The living is a vicarage, of the clear yearly value of 528*l.*, with a glebe-house. There were in the township, in 1833, one infant-school, with 26 children; three day-schools, with 78 children; and two national schools, with 86 children in the week and 111 on Sundays.

There are some populous townships and parishes situated around Newcastle. The township of Byker, in the parish of All Saints (pop. 5176), and the township of Jesmond, in that of St. Andrew (pop. 1393), are now included in the parliamentary and municipal borough of Newcastle. The township of Cowpen, in the parochial chapelry of Horton, is near the south bank of the river Blyth, and not far from the port of that name. There is an extensive colliery in the parish, which employs about 300 men. 'Cowpen Square,' near the river, consists chiefly of houses built for the colliers. Long Benton parish, near Newcastle, has an area of 8760 acres, with a population, in 1831, of 6613. It contains the townships of Long Benton, Little Benton, Killingworth, Walker, and Weetslet. The village of Long Benton consists of one long street, in which are some good houses and a number of neat cottages. Upwards of 1200 men are employed in the collieries of this parish, and about 40 or 50 in iron-founding. In the township of Walker are manufactories of bricks and tiles, and of copperas. There were, in 1833, one boarding-school, with about 20 boys; nine day-

schools, with about 387 children; and five Sunday-schools, with about 250 children. The parish of Wall's End, between Newcastle and Tynemouth, has an area of 2560 acres, with a population, in 1831, of 5510; it comprehends the townships of Wall's End, Howdon Pans, and Willington. The village of Wall's End is large and well built, with a spacious green in the centre; the parish church is a neat modern building. There are several places of worship in the parish for Methodists and Presbyterians. There are extensive collieries, in which upwards of 900 men are employed. At Howdon (or Howden) Pans (so called from the numerous salt-pans, now discontinued), are large docks, in which frigates and Indiamen were formerly built, but now only colliers. There is a covered ropewalk connected with the docks; and at East Howdon, close by, is a manufactory for coal-tar, varnish, and lampblack. There are staiths along the river, from which a great quantity of coal is shipped for London. There are also in the parish extensive lime-kilns and manufactories for copperas and earthenware. The parish of Wall's End takes its name from the Roman wall ending here on the north bank of the Tyne. There were, in 1833, sixteen day-schools, with about 551 children; a national-school, with about 180 children in the week and 200 on Sundays; and five Sunday-schools, with 490 children.

Ford is near the Scottish border, on the right bank of the Till, about 9 miles from Wooler. The parish comprehends an area of 12,220 acres, and had, in 1831, a population of 2110. The village consists of one irregular street, on an eminence rising from the river, over which is a bridge. Ford Castle is on the north side of the village and was originally built in the reign of Henry III., by Sir William Heron, and was in great part rebuilt by the late Lord Delaval. Of the original structure only two towers on each flank of the present edifice remain. The castle commands a fine prospect up the valley of the Till as far as Wooler. It was antiently a border fortress of importance, and suffered severely from the Scots in an incursion in the year 1385: it was taken by James IV. A.D. 1513, just before the battle of Flodden (which was fought in this parish), and was again captured, with the exception of one tower, which held out, in 1549. Besides the parish church, there are two dissenting places of worship. Nearly 200 men are employed in the parish in the coal-pits and stone-quarries. There were, in 1833, six day-schools, with 197 children; one day and Sunday school, with 60 children in the week and 26 on Sunday; and one Sunday-school, with 15 children.

Corbridge is in the east division of Tindale ward. The parish has an area of 13,130 acres, with a population, in 1831, of 2091, of which 1292 were in the township of Corbridge. This large and populous village is on the north bank of the Tyne, over which there is a bridge of seven arches. It consists of a main street, along the road from Newcastle to Hexham, and several smaller streets. There is a spacious market-place, which formerly contained a cross. The parish church is a very antient structure, of larger dimensions formerly than at present; and at the north-east corner of the market-place is an antient tower, formerly used as a prison, and now as a lock-up house. Corbridge was formerly a place of importance and a market-town. It had four parish churches, three of them now demolished. There are traces of extensive buildings between this place and the neighbouring Roman station of Corchester. This town suffered much from the Scots, A.D. 1296 and 1311. At Stagshawbank, 2½ miles north-east of Corbridge, one of the largest sheep-fairs in the north of England is held. The living of Corbridge is a vicarage, united with the chapelry of Halton, of the clear yearly value of 482*l.*, with a glebe-house. There was in 1833 a national-school in the township, with 61 children; and in other parts of the parish there were two day-schools, with 62 children, and one Sunday-school, with 40 children.

*Divisions for Ecclesiastical and Legal Purposes.*—The whole county of Northumberland is included in the diocese of Durham; the district of Hexhamshire, which was till lately in the peculiar jurisdiction of the archbishop of York, has been by an order in council added to the diocese of Durham. The whole county, with the detached portions of Durham, constitutes the archdeaconry of Northumberland; and is subdivided into the five rural deaneries of Newcastle (21 benefices), Corbridge (20 benefices), Bamborough or Bamburgh (17 benefices), Alnwick (20 benefices), and Morpeth (19 benefices): making the total number of



benefices, in the year 1811 (when the *Historical and Descriptive View of Northumberland*, from which we take these numbers, was published), 97. The number of benefices in Hexhamshire is 7; these are included in the number assigned above to the deanery of Newcastle, to which that district has been added.

The Dissenters of Northumberland are chiefly Presbyterians, and the Presbyterian form of church government exists among them in greater completeness than is usual in England. There were, in 1811, in the county of Northumberland, in the detached portions of Durham, and in the town of Berwick-upon-Tweed, 44 Presbyterian congregations, viz. 27 in connection with the kirk of Scotland; 11 in connection with the Scotch Seceders (viz. 5 Burghers, 4 Antiburghers, 2 of the 'Relief'); and 6 others not connected with any Presbyterian body. There were at the same time 5 Independent and 2 Baptist congregations, with a few scattered Baptist societies which met for worship but had no stated ministers. There were also 22 Catholic chapels, 11 of them attached to the residences of the Catholic gentry or supported by them. It is probable that during the last few years the number both of Catholic and Dissenting places of worship has been materially augmented.

The county is in the northern circuit. The assizes are held at Newcastle, to which the judges proceed from Durham. The quarter-sessions are held at Newcastle (Epiphany), Morpeth (Easter), Hexham (Midsummer), Alnwick and Berwick (Michaelmas). The county gaol and house of correction is at Morpeth; there are other houses of correction at Tynemouth, Hexham, and Alnwick. The number of persons committed to these various places of confinement was as follows:—

	Year ending October,		
	1834.	1835.	1836.
Morpeth . . .	191	194	136
Tynemouth . . .	107	89	161
Hexham . . .	56	53	78
Alnwick . . .	105	91	69
	459	427	444

There is a common gaol at Newcastle-upon-Tyne for the county of the town of Newcastle; to which the committals were as follows:—1834, 477; 1835, 415; 1836, 539. The county gaol, the Hexham house of correction, and the Newcastle gaol, are for debtors as well as criminals; and on the average nearly half the committals to Newcastle gaol are for debt.

Before the Reform Act, only six members of parliament were returned from Northumberland, viz. two knights of the shire, who were elected at Alnwick, and two members each for the boroughs of Newcastle and Morpeth. By the Reform Act the county was formed into two divisions, each returning two members. The northern division consists of Glendale, Bamborough, and Coquetdale wards; with Northamshire, Islandshire, and Bedlingtonshire, parts of the county of Durham; and Berwick bounds; all which are, for parliamentary purposes, annexed to Northumberland. The court of election for this division is held at Alnwick; and the polling-stations are Alnwick, Berwick, Wooler, Elsdon, and Morpeth. The southern division comprehends Tindale (or Tynedale) and Castle wards, and the county of the town of Newcastle. The court of election for this division is held at Hexham; and the polling-stations are Hexham, Newcastle-upon-Tyne, Haltwhistle, Bellingham, and Stamfordham. By the Reform Act, Morpeth was reduced to one member, but the new borough of Tynemouth was created, returning one member, so that the number of borough members remained as before. The boundaries both of Newcastle and Morpeth were extended; and Tynemouth was declared to include the townships of Tynemouth, North Shields, Chirton, Preston, and Cullercoats.

Berwick-upon-Tweed returned two members before and after the Reform Act; the townships of Tweedmouth and Spital were added by the Boundary Act.

*History, Antiquities, &c.*—In the earliest period of the history of the island the eastern side of the county and the adjacent parts of Scotland were inhabited by the Otadeni ('Οταδηνοι, Ptol.), whose towns were Curia (Κούρια, Ptol.) and Breminium (Βρεμίνιον), the latter of which was in Northumberland. On the west of the Otadeni, in Northumberland, Cumberland, and Galloway, were the Gadeni (Γαδηνοι, Ptol.), none of whose towns are mentioned by Ptolemy. The Alaunus (Ἀλαννος) of Ptolemy, which has

been identified with the Tweed (Horsley) and the Coquet (*Maps of the Society for the Diffusion of Useful Knowledge*) should rather be identified with the Alne; at least if the name may be taken as a guide. The Alauna of Richard of Cirencester (Iter IV.) is evidently the same as the Alaunus of Ptolemy; and the Tueda of Richard (Iter IV.) may be safely identified with the Tweed.

There are several remains of the primitive inhabitants of the country, consisting chiefly of rude hill-forts, cairns, and Druidical monuments. In Armstrong's map of the county the forts are marked as being very numerous, especially amid the hills of the border toward Scotland. To what historical period they are to be referred is doubtful. Some may be memorials of a period anterior to the Roman conquest under Agricola; others may be referred to the struggles of the inhabitants or northern Britons with the Romans under Severus and his successors; and others to the subsequent struggle against the Northumbrian Angles.

Of these British remains, one of the most remarkable is on Yevering Bell, near Wooler, where the nearly level summit of an oblong mountain, which rises 2000 feet above the adjacent plain, is encircled with the remains of a wall built of large flat whinstones without mortar, and enclosing a considerable area. The medium breadth of the ruined wall is eight feet. There is an entrance on the south side. There is an inner enclosure, formed of stones, with a ditch inside; and this inner enclosure contains a large cairn of stones. On the sides of the hill are the remains of circular buildings; but so far ruined and the stones so scattered, as to render it impossible to ascertain their former use. There are also the traces of a grove of oaks. It has been conjectured that it was a Druidical temple.

On a hill called Humbleton Hugh, near Wooler, is an ancient entrenchment, with a huge cairn. The slope of the hill consists of terraces rising one above another; these terraces are commonly supposed to be artificial, and various conjectures have been formed as to their origin and use. They are observed on the face of other hills in the neighbouring districts and also in Scotland, and are usually surmounted by hill-forts. Possibly they owe their origin to the disintegration of the strata of the rocks of which the country is composed. There is a somewhat similar fort at Cornhill near the Tweed.

Between the village of Ilderton in Coquetdale ward and Hedgehope, one of the border hills, is a Druidical monument consisting of ten large rude and unequal stones, arranged so as to enclose an oval area of thirty-eight yards from east to west by thirty-three from north to south. The stones are mostly thrown down and partly buried in the earth. It is probable they were originally more numerous.

Of other forts or camps may be mentioned those at Spindleston near Bamborough; that near Alnham, by the head of the Aln; those on Bewick Hill and at Harup Burn between Alnwick and Wooler; that at Old Rothbury near the modern town of the same name; those near Craghead in Rothbury Forest, Motehill, Elsdon (where Roman inscriptions have been dug up), between Bellingham and Rothbury; and a camp near Belford, nearly square, which has usually been ascribed to the Danes.

The Romans do not appear to have attacked this part of the country until the time of Agricola, who was sent over to Britain, about A.D. 78, as governor. [AGRICOLA.] His predecessors had subdued or nearly subdued the Brigantes, whose territory probably extended to the Tyne. It appears to have been in the second year of his command (Tacit., *Agrie. Vita*, c. xx.) that he formed that line of forts which extended from the German Ocean to the Solway Frith, and nearly coincided with the line of the great wall subsequently erected. Of the subjugation of the Otadeni and Gadeni by him we have no distinct account. They were perhaps brought into subjection during the second year of his command, or were among the nations whose country he ravaged in his third campaign, when he advanced into Scotland as far as the Tay. He secured his conquests by a second line of forts extending from the Forth to the Clyde.

The northern conquests of the Romans were by no means permanent. Agricola was recalled, and the Roman power languished. The Caledonians continued hostilities, and several tribes, who had submitted, revolted (Spartian., *Vita Hadrian*); and the emperor Hadrian found it expedient to abandon all the country between the two lines of forts built by Agricola, and to defend the southern part of the island by a rampart of earth. Hutton (*Hist. of the Roman*

*Wall*) considers that Agricola had carried a ditch and bank across the island, and that Hadrian repaired this and strengthened it by new defences. Perhaps some posts were maintained by this emperor beyond the line of the wall. In the reign of Antoninus Pius, the district between the two lines of forts formed by Agricola was reconquered by Lollius Urbicus, lieutenant of the emperor, who raised a rampart of turf (*muris cespitiis*) across the island in the direction of the northern line. Hostilities between the Romans and the yet unsubdued natives were renewed under Marcus Aurelius, the successor of Pius, but the historians of the period give us no particulars. In the following reigns Northumberland and the rest of the country between the two walls appear to have regained their independence: the tribes who inhabited them seem to have united into one body, called by the Romans *Mœtæ* (*Mauræ*), a name which is supposed to be derived from the British word 'meath,' denoting a plain. Severus was engaged in active warfare against these natives (A.D. 207-210): he lost 50,000 men, but ultimately obliged them to submit. He carried a strong wall (*muris*) across the island nearly in the line of Hadrian's rampart. Hostilities were soon renewed by the natives, and Severus died at York in the midst of his preparations to extirpate them (A.D. 210 or 211). Caracalla, his successor, hastily made peace with the natives; and it is likely that the independence of the country north of the wall was tacitly admitted if not recognised, though some fortified posts were probably retained by the Romans. The subsequent history of the county during the Roman period is obscure: it was probably the seat of hostilities under Constantine and Valentinian (Ammianus Marcellin., lib. xxvi. 4; xxvii. 8), under the latter of whom, Theodosius, a Roman general, recovered this and the adjacent districts, to which the name Valentia was given. When the Roman power in Britain was vigorously wielded, this province appears to have been subject to the Romans; when the administration was feeble, the natives resumed independence and perhaps active hostility.

The most remarkable monument of the Roman dominion is the great line of defence formed and augmented by the successive labours of Agricola, Hadrian, and Severus; and sometimes called 'the Picts' Wall,' sometimes 'the Roman Wall.' Some account of these great works has been given elsewhere. [BRITANNIA, vol. v., pp. 444, 445.] We have here only to notice in connection with them the position and traces of the stations along their line (*per lineam valli*) which are in Northumberland.

The first station, Segedunum, is generally fixed at Cousen's house, Wall's End, between Newcastle and Tynemouth: there are no remains. Pons Ælii, the second station, was, in the opinion of most antiquaries, at Newcastle; but Camden was induced by the name to fix it at Ponteland, which is north of the wall, on the Pont, one of the branches of the Blythe,  $7\frac{1}{4}$  miles north-west of Newcastle. Condercum, the third station, is fixed at Benwell Hill, an eminence 2 miles or  $2\frac{1}{4}$  miles from Newcastle; there are very distinct traces of this station above the village of Benwell. Vindobala, the fourth station, is fixed at Rutchester, or Rouchester: the ramparts of this station, which was large, are very visible. The station is situated just on the line of the wall; and that part of the station which lay beyond the wall to the north was strengthened by several towers. Some slight portions of the masonry remain. A great number of coins and other antiquities have been dug up near this station. The fifth station, Hunnum, was at Halton Chesters: it was between Hadrian's rampart and the wall of Severus. Coins, inscriptions, urns, and other antiquities have been discovered here. Cilurnum, the next station, was at Walwick Chesters, close on the right or west bank of the North Tyne. Its area is rather above the usual extent of the stations, being about eight acres. The ground within the vallum is crowded with the ruins of stone buildings, which formed apparently two streets from east to west, and a third cross street from north to south. This station is just on the line of the wall of Severus, having Hadrian's rampart on the south side of it. Procolitia, the seventh station, was on an open elevated spot at Curraw-burgh. A great part of the rampart is very entire, and the wall of Severus, which forms the north side, is in good preservation. About half a mile south-west of this station is a square fort called Brown Dykes or Broom Dykes, which appears to be of Roman origin. There was also a station at Shewing Shields, a little to the west of Procolitia. Horsley conjectures that it

belonged to Hadrian's line of defence, but became useless when the wall of Severus was built. Borcovicus, the eighth station, is fixed at House Steads, 6 or 7 miles north-east of Haltwhistle. This is the most perfect and the grandest station on the whole line. It is on an elevation, with a steep or precipitous descent toward the north, and a gentler declivity toward the south: it comprehended fifteen acres, and had a large suburb on the south side. As many as twenty streets may be counted. A great number of altars, inscriptions, and other antiquities have been discovered here. There was a temple of Doric architecture; and part of a Doric capital and fragments of the shafts of columns have been discovered: a Roman altar, the inscription of which is perfect, now decorates the fireplace or mantel of a neighbouring farm-house. Between the two last-mentioned stations, Procolitia and Borcovicus, the works of Agricola and Hadrian and those of Severus separate, the former being carried along the lower ground, while the wall is carried over crags and precipices, and, from the deep declivity on the north, needs no ditch. There are one or two gaps in the craggy ridge, over which the wall is carried, by which gaps the Picts, and after them the moss-troopers of the border, frequently broke in. Vindolana, the ninth station, is generally placed at Little Chesters. The ramparts of this station are visible, but the ditch is nearly filled up: it lies a mile if not two miles south of the wall. The prætorium may be distinguished; and several antiquities have been discovered here. Ælica, the tenth station, is at Great Chesters: the trenches and ramparts are well preserved, and the prætorium is visible: there are the ruins of several buildings. Several remains of the south entrance of the station, part of the jambs, and pieces of an iron gate and hinges were found here; and a variety of broken altars and effigies have been discovered. Magna, or perhaps Magnæ, the eleventh station, is fixed at Carvoran, close to the border of the county toward Cumberland. It is a small station, and lies to the south of both the rampart of Hadrian and the wall of Severus. It is on low ground in a valley watered by two little rivers, the Tiffa, which falls into the Tyne, and the Irthing, which flows into the Eden. Many antiquities have been dug up. The military roads which accompanied the course of the wall may be traced in several places. The modern turnpike-road runs in some parts on the foundation of the wall of Severus.

Beside the stations on the line of the wall, there were some other places of note in this county in the time of the Romans. The Bremenium of Ptolemy, noticed in the first *Itinerary* of Antoninus under the slightly varied name of *Bramenium*, has been fixed by Camden, Horsley, and other antiquaries, at Riechester, or Rochester, on the Reed, which falls into the North Tyne. Reynolds (*Iter Britanniarum*) contends for Newcastle, but with more zeal than success. This station appears to have been of great strength and importance, being defended by a wall of ashler-work seven feet thick, three ramparts of earth, and moats, and was probably maintained as an outpost beyond the wall. Several altars, inscriptions, coins, and other antiquities have been found here. A station, to which, on the faith of an inscription found there, the name of *Habitancum* is given, was fixed at Risingham, where are the remains of a small fort. A great Roman road, to which the name of the Northern Watling Street was applied, entered this county from Durham, and passing Corstopitum, near Corbridge, divided into two branches, one of which ran by *Habitancum* and *Bremenium* into Scotland, while the other ran to the west of Morpeth and Alnwick into Scotland near Berwick. At Corstopitum, or Corstopium, now Colchester, or Corchester, near Corbridge, a Roman town or station, almost entirely levelled, many antiquities have been discovered. Some antiquaries have fixed the *Curia* (*Κουρία*) of Ptolemy, one of the towns of the *Otadeni*, here. Just before entering Scotland, the western branch of Watling Street passed a camp at Chew Green, near the head of the Coquet, supposed to be 'Ad Fines,' a station in the fifth *Itinerary* of Richard of Cirencester. This is a very remarkable camp, with numerous ramparts and ditches in excellent preservation. A Roman road, called 'the Maiden Way,' entered the county from near Aldstone in Cumberland, and ran north to the station Magna on the wall.

Beside these stations and places to which a name may be assigned, there are other places in which Roman antiquities have been discovered. Hexham has been noticed already. Whitley Castle, on the Maiden Way, just on the border of Cumberland, is a Roman camp, fortified with many trenches

and breastworks of earth. At Old-town in Allendale are the traces of another camp or station, and many antiquities have been discovered. There are camps at Outehester, or Ulchester, near Bamborough, at Shildikes in Rothbury Forest, and in other places. Altars, inscriptions, or other antiquities have been dug up or found at Elsdon in Redesdale (the Valley of the Reed), Simonsburn, near the North Tyne, just without the wall, at Tynemouth, and other places. Indeed, in the number of Roman inscriptions and sculptures discovered in it, Northumberland very far surpasses any other English county.

Upon the departure of the Romans in the fifth century, Northumberland became the prey of the Picts and other barbarians, who broke through the wall and ravaged the island. When the Saxons were invited to oppose these invaders, a body of them, under Octa and Ebusa, were posted with their ships at the east end of the Roman wall (perhaps A.D. 454); but it was not till near a century afterwards (A.D. 547) that a serious attempt was made at the permanent conquest of this part of the country. A considerable part of the country between the Humber and the Forth was divided into the two states of Bryneich and Deifyr; and it is probable that Northumberland was included in Bryneich, the northernmost of these. Perhaps some portions of the county may have been included in the district of Gododin, of which the bard Aneurin was chief, or in that of Reged, which was governed by Urien, the patron of the bard Taliesin. The invaders were Angles, and their leader, Ida, though he experienced a stout resistance from the natives, especially from Urien, laid the foundations of an Anglo-Saxon kingdom in Bryneich, or Bernicia. He built a castle on the coast, to which he gave the name of Bebban Burgh, since better known as Bamborough; or perhaps he seized on a Roman fort, and added to it some further defences of his own. Ida died A.D. 560. The reigns of his immediate successors were brief, and not marked by any particular events; but the power of the invaders gradually extended. One of their chieftains, named Ella, separating himself from the other Angles of Bryneich, founded the kingdom of Deifyr, or Deira, separated from Bryneich by a vast forest that occupied what is now the county of Durham; and other warriors, penetrating to the southward, established the state of Mercia, the latest founded of the Anglo-Saxon kingdoms; first a dependency of Deifyr, but at length an independent state, and the powerful competitor of Wessex for the supreme dominion of Britain. The two kingdoms of Bryneich and Deifyr were frequently united, and, when so united, constituted the great kingdom of Northumbria (we appropriate this form of the name to the kingdom, Northumberland to the county), of the history of which we shall give a sketch here. This kingdom extended along the eastern shore of the island from the Humber to the Forth, thus including a considerable portion of the lowlands of Scotland. It was bounded on the west by the British kingdoms of Strathclyde, or Vale of Clyde, and Cumbria, which extended south to Lancashire. The boundary of the Northern Angles and Cumbrian and Strathclyde Britons is not clearly ascertained, and probably varied much with the changing fortunes of the parties. The superiority of the invaders was however gradually but firmly established.

Ethelfrith or Ædelfrid, grandson of Ida, distinguished himself by his vigorous attacks on the Britons. He carried his arms into their territories, gained a great victory near Chester, and massacred the monks of Banchor, or Bangor, on the Dee in Flintshire (who had accompanied the British host into the field), and demolished their monastery. These transactions are variously dated A.D. 602 to 612 or 613. Ethelfrith was defeated and slain (A.D. 617) by Redwald of East Anglia [NORFOLK], and succeeded by Edwin, of the race of Ella of Deifyr, whose history is given elsewhere. [EDWIN.]

On the death of Edwin (A.D. 633), under whom the two Northumbrian kingdoms were united, his dominions were ravaged by the combined Mercians and Britons. Osric, a kinsman of Edwin, who succeeded to the crown of Deira, or Deifyr, and Eanfrid, son of Ethelfrith, who succeeded to Bernicia, or Bryneich, restored paganism, which Edwin had renounced: they were both speedily slain by Cadwallon, or Cadwallader, the Briton, who seized both the Northumbrian kingdoms, but was himself defeated and slain by Oswald, another son of Ethelfrith (A.D. 634 or 635), in the neighbourhood of Hexham, perhaps at St. Oswald's, in the line of the Roman wall. Oswald succeeded to both the king-

doms of the north; and did much for the promotion of Christianity, which Edwin had introduced. He was recognised as Bretwalda of Britain, and his supremacy was acknowledged by what Bede calls the four tongues of Britain, the Angles, Britons, Picts, and Scots. He fell in battle against Penda the Mercian at Maserfelth, probably at or near Oswestry in Shropshire (A.D. 642). The place where he fell attests the extent of his dominions, for he was not the invader, but the invaded party. Penda, flushed with success, overran Northumbria; but Bebbanburgh resisted his attacks, and the steps which he took to burn it led to his repulse. Oswy, or Oswio, brother of Oswald, was then chosen successor to the Northumbrian crown in Bernicia, and Oswin, son of that Osric whom Cadwallon had slain, in Deira.

Oswio became more powerful than any of the sovereigns who had yet reigned over Northumbria. He subdued the greater part of the Picts and Scots, attacked Deira, and, on the death of Osric, who was killed by treachery (A.D. 651), obtained part of that country, leaving the rest to his nephew Ethelwald, the son of Oswald; and, having defeated and slain the warlike Penda (A.D. 655), possessed himself of Mercia, part of which he granted to Penda, son of Penda. The Mercians however soon revolted, and raised Wulfhere, another son of Penda, to the throne. But Oswio remained the most powerful of the Anglo-Saxon princes: he enjoyed the dignity of Bretwalda, and was addressed by Pope Vitalian as 'Rex Saxonum.' The archbishopric of York was coextensive with the dominions of Oswio, and comprehended the territory of the Picts. He died (A.D. 670), after a reign of twenty-eight years, and was succeeded by his son Egfrid.

Upon the accession of Egfrid the Picts attempted to regain their independence, but were defeated with great slaughter. He wrested Lindsey (a part of Lincolnshire) from Wulfhere; and divided his kingdom, thus enlarged, into three dioceses: Bernicia, the see of which was at Hexham, afterwards at Lindisfarne; Deira, see at York; Lindsey, see at Sildnaceaster or Sildnacestre. Subsequently a bishop of the Pictish provinces was appointed. Alfwil, brother of Egfrid, reigned in some part of Northumbria, in subordination, it is likely, to the supremacy of Egfrid. Egfrid sent an army to Ireland, and conquered several portions of territory from the Cumbrian Britons (A.D. 684 and 685). He fell at last in battle against the Picts, whose country he had invaded (A.D. 685), and was succeeded by his brother Aldfrid, or Eadferth, who reigned nineteen years (A.D. 685-705). He was a religious and learned prince. After him came Osrid his son, who reigned eleven years (A.D. 705-716), and died in battle, probably against the Picts, with whom both Aldfrid and Osrid had carried on hostilities. According to another account Osrid fell by assassination by the hands of Cenred, or Cenred, who succeeded him and reigned two years (A.D. 716-718), and of Osric, who succeeded Cenred, and reigned eleven years (A.D. 718-729). Ceolwulf succeeded his brother Cenred. In his reign Ethelbald of Mercia invaded and ravaged Northumbria, carrying off with him great booty. Ceolwulf was a weak prince, and the misfortunes of his reign led to treasonable plots, which induced him to abdicate the throne. Eadbert succeeded (A.D. 737), and, in a vigorous reign of twenty-one years, subdued all the neighbouring kings, Angles, Picts, Britons, and Scots. In alliance with the Picts he took Alcluid, or Dumbarton, a fortress of Strathclyde. Pepin, king of the Franks, sought his friendship. He resigned his crown (A.D. 758), and retired to a monastery. A long list of princes, whose short reigns were marked by bloodshed and treason, succeeded to the throne. The annals of Northumbria are a mere chronicle of murders, battles, revolts, and depositions, till the accession of Eanred (A.D. 809). The limited power or unambitious disposition of this prince induced him to submit without resistance to Egbert, who acquired for Wessex the permanent supremacy of the Anglo-Saxon kingdoms.

In the year 844 the Danes attacked Northumbria, and slew Redwulf, who had usurped the throne, and Alfred, who was probably coadjutor of Redwulf in the government. In 867 Northumbria was again assailed by a vast armament of these invaders, under Ingwar, or Ivar, Halfdene, and Hubba, sons of Regnar Lodbrog, who are said to have come in order to revenge the death of their father, who had perished in Britain, and most likely in Northumbria. The government of that kingdom was at that time contested by

**Osbert** and **Ells**, who, on the approach of the Danes, made peace with each other, and divided the kingdom between them. They both fell in an attempt to recover York, which the Danes had taken. That part of Northumbria which was north of the Tyne was bestowed by the invaders upon **Egbert**, but he was expelled by the Northumbrians, and succeeded by **Ricsig**, after whom came another **Egbert**. In this period the Danes made an entire conquest of the country, and settled in it. **Halfdene** became sovereign, and divided the kingdom among his followers.

It is difficult to trace the causes which led to so complete a subjugation of the north of England by these invaders. Perhaps the strength of the Northumbrian kingdom had been consumed in the domestic strife of so many years, or the dissensions which had prevailed made each party prefer the dominion of strangers to that of their rivals. It may be, too, that the ferocity engendered by a long period of anarchy had prepared the population for readier coalition with those to whose habits their own had become assimilated. However this may have been, the conquest was complete; and in the treaty which **Alfred** made with the invaders, Northumbria was included in the Danelagh, or Danish territory. On the death of **Halfdene** (A.D. 883) **Guthred** and **Egbert** succeeded respectively to the crowns of **Deira** and **Bernicia**, to which latter kingdom the name of Northumbria began about this time to be restricted, though we shall still use it in its more extended application.

The territory between the Tyne and the Tees was bestowed on **St. Cuthbert** (who had appeared in vision to **Eadred**, then bishop of **Lindisfarne**), and became thus the portion of the bishops of **Durham**, and the foundation of their palatinate jurisdiction. On the death of **Guthred**, who, though of Danish birth and lineage, appears to have embraced Christianity, the Northumbrians, Danes as well as English, appear to have submitted to **Alfred**. **Eric**, or **Bohric**, is recorded as the leader of those who remained pagans; but he recognised the supremacy of the West Saxon kings.

Against the successors of **Alfred** the Northumbrian Danes continually renewed the struggle, but always with ill success. On the accession of **Edward the Elder** (A.D. 901), **Eric** and his followers supported his competitor **Ethelwald**; but both **Ethelwald** and **Eric** fell in battle, and Northumbria submitted to **Edward**. A new invasion or insurrection of the Northmen, under **Regnald**, **Sihtric**, and **Niel**, or **Nigel** (the last two being sons of **Ingwar**, or **Ivar**), followed; and as far as we can gather from **Simon of Durham**, they defeated, near **Corbridge**, a confederate army of Scots and native Northumbrians, and seized the whole kingdom, but were compelled to acknowledge the supremacy of **Edward the Elder**. **Nigel** was killed by his own brother **Sihtric** before the submission of the Danes to **Edward**.

**Sihtric** married the sister of **Athelstan** (about A.D. 925), who had succeeded to the throne and supremacy of his father, **Edward the Elder**: he consented to embrace Christianity, and governed **Bernicia** as subordinate to him. On **Sihtric's** death (A.D. 926) his son and successor **Guthferth**, or **Godefrid**, endeavoured to throw off his subjection to **Athelstan**, by whom he was defeated and expelled (A.D. 927). **Regnald** governed at this time a portion of Northumbria, and one **Eric** obtained another considerable portion, perhaps of the dominions of the expelled **Guthferth**, as vassal of **Athelstan**, on condition of embracing Christianity and defending the dominions entrusted to him against Scots and pagan Danes.

The rising power of **Athelstan**, and his inveterate hostility to **Guthferth**, whom he compelled the king of Scotland to dismiss, provoked a general confederacy against him. He is said to have added Northumbria to his dominions, at least to have exercised a sovereignty which had not been previously claimed. **Anlaf**, **Aulaf**, or **Olave**, son of **Guthferth**, and 'king of Ireland and the Isles,' arrived in the Humber with a mighty fleet, increased by piratical adventurers from Norway and the Baltic, and accompanied by **Constantine of Scotland**. The Northumbrian Danes rose in favour of **Aulaf**, and perhaps those of East Anglia; and the Britons of **Cumbria** and **Wales** joined in the attempt to overthrow the supremacy of **Athelstan**, who, at this crisis, augmented his own forces by mercenary troops and auxiliaries from **Rollo of Normandie**. [NORMANDIE.] The contending parties met at **Brunanburh**, or **Brunna-burgh**, probably in Northumbria (A.D. 937): the victory of **Athelstan** was decisive, and was commemorated in the

**Sagas** of the north and the songs and chronicles of England. **Aulaf** fled, and Northumbria was incorporated in the dominions of **Athelstan**.

On the death of **Athelstan** and the accession of his brother **Edmund I.** (A.D. 941), **Aulaf** possessed himself of Northumbria and a part of **Merica**. He defeated **Edmund** at **Tamworth** and **Leicester**, and obtained the cession of all England north of **Watling Street** (A.D. 943). This was the utmost extent of the Danelagh, as arranged by **Alfred**. The sovereignty of **Aulaf** seems moreover to have been independent of the West Saxon crown; and it was agreed that whichever of the two princes survived, the other should succeed to the whole. **Aulaf** died soon after; and **Edmund** seized Northumbria, driving out **Aulaf II.**, son of **Sihtric** and uncle to the late **Aulaf**, and **Regnald**, son of **Guthferth** and brother of **Aulaf I.** He also conquered the **Cumbrian Britons**, and gave their territories to the king of Scotland on condition of securing the north against invaders.

On the accession of **Edred**, brother of **Edmund** (A.D. 947), the Northumbrians renewed their homage to the West Saxon, or, as we may now call it, the English crown; but within a year or two violated their engagements, and made a final effort for independence. **Eric**, whom **Athelstan** had set over part of Northumbria, but who had forsaken his government and turned pirate, was chosen king by them: he was however unable to retain his kingdom. **Edred** ravaged Northumbria (A.D. 949, 950), and the Northumbrians abandoned **Eric**, who was slain by treachery. The kingdom of Northumbria was now extinguished, and the regions which composed it were divided into earldoms or counties, of which **Bernicia**, or Northumbria north of the Tyne, was one, **Deira** (Yorkshire) another, and **Lothian** (south of Scotland) a third. It is probable that **Bernicia** was nearly continuous with the present county; to this therefore, under the name of Northumberland, the rest of our notice will be confined. It may be as well to mention that **Lothian** was ceded (about A.D. 971) to the kings of Scotland, in feudal subjection to the English crown.

In the wars of **Ethelred II.** with the Danes, **Bebbanburgh** was stormed (A.D. 993); and some years after (A.D. 1013) the north of England passed with little resistance into the power of **Sweyn**, by whom it was held till his death. **Canute**, son of **Sweyn**, soon repossessed himself of it, and held it until, on the death of **Edmund II.**, all England became subject to him. During this period the earldom of Northumberland was held by **Oswulf** and his descendants, **Eadulf**, **Ethelred**, or **Aldred**, **Waltheof I.**, and **Uchtred**, the last of whom deserted from **Ethelred** to **Canute**, by whose order he was slain (A.D. 1016). His death was avenged by his son **Aldred II.**, who slew **Thorbrand**, **Canute's** instrument in the murder; but was himself slain by **Charles**, son of **Thorbrand**. He was succeeded in his earldom by his brother **Eadulf**, who defeated the Britons of **Strathclyde**, but was killed by **Siward**, who became earl of Northumberland in his room.

These transactions show the anarchical state of Northumberland, the result of that practical independence which its remoteness from the seat of the supreme government secured to it. **Siward** held the earldom of York as well as of Northumberland (A.D. 1042-1055), and ruled with vigour and success. He formed one of the band of nobles who counterbalanced, during the reign of **Edward the Confessor**, the power of **Earl Godwin**, or **Godwin**, and his family; and the share he took in the restoration of **Malcolm III.** Canmore to the throne of Scotland has been made generally known in the 'Macbeth' of **Shakspeare**. On the death of **Siward**, his earldoms were granted to **Tostig**, brother of **Harold**, afterwards king; but his northern subjects rejected him and chose **Morkar**, or **Morkar**, son of **Algar**, earl of **Chester**, in his room (A.D. 1065). **Morkar** granted the earldom of Northumberland to **Osulf**, a descendant of the former earls, but in subordination to himself.

On the Conquest (A.D. 1066), **William** imprisoned **Morkar** and deposed **Osulf** from his earldom, which he conferred on **Copsi**, an adherent of **Tostig**. **Osulf** on this assassinated **Copsi**, but was himself killed by a robber soon after. The earldom was subsequently possessed by **Robert Comyn**, a Norman or other foreign companion of **William**, who killed in a rising of the people at **Durham**; by **Copsi**, a Saxon, whom **William** afterwards expelled from the earldom; by **Waltheof**, son of **Siward**, another Saxon, as a traitor at **Winchester**; by **Walcher**, bishop of

a Norman, murdered in a tumult at Gateshead; by Alberic, a Norman; and by Robert de Moubray, a Norman. In the stout resistance offered by the men of the north of England to the Norman power, and in the fearful vengeance by which that resistance was punished, few events can be connected with the county of Northumberland, except the removal of the body of St. Cuthbert from Durham to Lindisfarne, or Holy Island. It is probable that the county was then thinly peopled and little cultivated. Its great sources of wealth, its mineral treasures, required a more peaceful time and a more advanced civilization to develop them. It may be supposed that the dissension and anarchy which had for two or three centuries pervaded the north, and the infusion of the manners of the barbarous Northmen, had thrown back the population in the scale of social improvement, or at least retarded their advance. When William (A.D. 1068 or 1069) had wasted and depopulated the more densely inhabited tract between York and Durham, he seems to have disregarded the country beyond the Tyne. We do not find that he penetrated into it, except in his way to invade Scotland (A.D. 1072), and in his return. The county, as well as Cumberland, Durham, and Westmoreland, is omitted in 'Domesday Book.' About this time it was exposed to the ravages of the Scots, who are said to have carried off so many of the inhabitants, that there was scarcely a house in Scotland without one or more English slaves.

As the Scottish princes augmented their territories and consolidated their power, and as the Anglo-Norman princes on the other hand grew in wealth and resources, Northumberland became subject to the evils and received the constitution of a border county. The earldom became merely titular, and the government of the county was given to the high-sheriff, who was entrusted with unusual powers. The county was subdivided into baronies, which were arranged in six wards and subdivided into constablies. Excursions for plunder became the occupation of the borderers on both sides of the frontier, and they alternately inflicted and endured the miseries of petty but uninterrupted warfare. Agriculture in so insecure a state was neglected, and the cattle became the chief property of the landowner. Castles and towers were erected in almost every part, and every habitation was constructed with a view to defence as well as residence. Resistance to the plunderers led to scenes of blood, and bloodshed laid the foundations of deadly feuds. The borderers acted for the most part as light cavalry, called 'prickers;' they rode small but nimble and well-trained horses. Those who acted as infantry were of excellent skill and courage. They had their places of rendezvous, to which they repaired at the signal of their beacon fires. The English borderers excelled in the use of their national weapon, the long bow; and their onset, when they closed, was signalled by the war-cry or 'slogan.' The fierce and unsettled habits caused by such a condition continued till modern times. The inhabitants of the eastern border, toward Berwick-upon-Tweed, were first brought into a more peaceful way of life; but amid the wastes and fastnesses of the western side of the county the borderers have only at a comparatively late period become assimilated to the rest of their countrymen.

In the reign of William Rufus, Northumberland was twice invaded by Malcolm III. Canmore, king of Scotland. His first invasion (A.D. 1091) was retaliated by William, and Malcolm was compelled to submit. In his second invasion (A.D. 1093), after committing great ravages, he was surprised and slain, with his eldest son Edward, while besieging the castle of Alnwick, by Robert de Moubray, earl of Northumberland. This Robert soon after conspired, with other nobles, against William; but that king crushed the conspiracy by his alertness, besieged successively Tynemouth and Bamborough castles, and took Moubray prisoner.

Upon the accession of Stephen to the throne of England, David, king of Scotland, having determined to support the claims of the empress Maud, invaded the north of England and took Wark and Norham castles, and the towns of Alnwick and Newcastle. He failed in his attempt to take Bamborough; and upon the advance of Stephen peace was made (A.D. 1135 or 1136). A short time afterwards David, taking advantage of Stephen's absence in Normandie, again broke into Northumberland, to support the claim of his son Henry to the earldom of that county; but agreed to a truce until Stephen should return and give his decision of the claim. On the refusal of Stephen to admit this, war recommenced

(A.D. 1138). Wark Castle was besieged, but in vain, and the western side of the county ravaged, as far as the Tyne. On the approach of Stephen, the Scots retreated, but when the English king retired, they again advanced, and ravaged the eastern side of the county. Norham Castle was taken and demolished, and Wark a second time besieged, but with no better success than formerly; it was however blockaded. Upon David's return to Scotland, after his defeat in the battle of the Standard at Northallerton, he resumed the siege of Wark, and at length obliged the garrison by famine to capitulate (A.D. 1138). Peace was soon after concluded, and Henry's claim to the earldom admitted (A.D. 1139). This earldom was taken from the Scottish royal family by Henry II., and that of Northampton bestowed as a compensation.

In the civil strife near the close of the reign of Henry II., William the Lion, king of Scotland, supported the rebellious princes; and entering Northumberland, besieged Wark Castle, which had been restored (A.D. 1173). The siege failed, and the English in return crossed the Tweed and burned Berwick; but hostilities were suspended by a truce. On the expiring of the truce, the county was again invaded by the Scots. Harbottle and Warkworth castles were taken, and Prudhoe and Alnwick castles besieged. While before the latter, the Scottish king was surprised and taken prisoner (A.D. 1174). This event led to a peace.

In the civil troubles of the reign of John, Northumberland again was the scene of hostility (A.D. 1215). The insurgent barons were supported by the king of Scotland, who hoped to possess himself of the county. Norham Castle was vainly besieged by the Scots. Morpeth, Alnwick, and Wark were destroyed, to prevent their falling into the hands of John; and the town and castle of Berwick were taken and afterwards burned by his mercenaries, who advanced into Scotland and captured several towns. The king of Scotland received from the dauphin Louis (whose claim to the English crown he admitted) the cession of Northumberland and some other of the northern counties; but he did not succeed in gaining possession of them; and at the peace concluded about the commencement of the reign of Henry III. they remained still attached to England.

In the reign of Henry III. the Scottish king Alexander II. invaded Northumberland and advanced to Ponteland, while Henry with the English army was at Newcastle (A.D. 1244). Peace was however made without a battle.

When war broke out between Edward I. and John Baliol, king of Scotland (A.D. 1296), the king of England assembled his army at Newcastle, and marched to the relief of Wark, which was threatened by the Scots. He crossed the Tweed, took Berwick by storm, and after making a general carnage of the male inhabitants and defenders (except the garrison of the castle, which surrendered upon terms) and sending the women into Scotland, re-peopled the town with English settlers. In retaliation the Scots invaded Northumberland, besieged Harbottle Castle, but in vain; ravaged the districts of Redesdale and Tindale; destroyed Corbridge; burned the town, monastery, and church of Hexham, and committed other devastations (A.D. 1296). A year after they again entered the county under Wallace, after defeating the English at Stirling and recapturing Berwick, and having established their head-quarters in Rothbury Forest, devastated the country all round; and, after a vain attempt upon Newcastle and Carlisle, returned to their own country (A.D. 1297). Early the following year the English army assembled at Newcastle, and, marching into Scotland, entered Berwick, which the Scots had deserted.

Edward II. was at Newcastle (A.D. 1310) in an expedition against the Scots; and spent the winter of 1310-11 at Berwick, which might at this time be considered as an English town. Next year, while Edward invaded Scotland, Robert Bruce ravaged Tindale and Redesdale in Northumberland. In 1312 the king and his favourite Gaveston were surprised by the insurgent barons at Newcastle, and with difficulty escaped to Tynemouth, and thence by sea to Scarborough. In the same year the Scots again invaded the county, burned Corbridge and Hexham, and made a vain attempt on Berwick. The English army was assembled at Wark (A.D. 1314), and marched to Berwick previous to the great battle of Bannockburn. After that disastrous defeat, Northumberland was ravaged almost without resistance, and the victorious Scots penetrated into Yorkshire. A part of the inhabitants of Tindale and Redesdale were obliged to swear



allegiance to the king of Scotland; and the ravages of war reduced the inhabitants of the north of England to such distress, that they were obliged to eat the flesh of dogs and horses, and a quarter of wheat was sold for forty shillings, an enormous price at that time. The disorganised state of society led also to the formation of numerous bands of marauders. In 1318, Berwick, and the castles of Wark, Harbottle, and Mitford were taken by the Scots, who seized the whole county, except Newcastle and a few strongholds, and penetrated farther into England. Next year (A.D. 1319) the English, under the command of the king, made a strenuous but vain attempt to recover Berwick. In 1320 the Scots penetrated as far as Corbridge, and in 1322 they twice renewed their devastations. Hostilities were afterwards suspended by a truce, which continued till the deposition of Edward II. (A.D. 1327).

At the commencement of the reign of Edward III. the Scots renewed their ravages in this county, and the king, a boy of fifteen, who pursued them with a vast army, was unable to overtake them. In the course of the summer, the Scots took Norham Castle and attempted Alnwick, but failed. Peace soon followed, by which the town of Berwick was restored to Scotland.

In 1333 war broke out again. Edward besieged Berwick and ravaged Scotland; the Scots in return ravaged Northumberland and blockaded Bamborough, where Edward's queen was. The extremity to which the garrison of Berwick was reduced obliged the Scots to march to its relief; they were defeated at Hallidown Hill in the immediate vicinity, and the town capitulated. In 1340 and 1342 the Scots wasted Northumberland; in the latter year they were repulsed in attacks upon Newcastle and the castle of Wark. In 1346 they wasted the southern part of the county. In 1355 they surprised the town of Berwick, but failed in their attempts to take the castle, and early in the following year (1356) the town was retaken.

In the year 1372 the quarrels of the borderers brought on a severe battle at Carham, in which the Scots defeated a superior number of English. In 1378 the castle of Berwick was surprised by a few borderers and held by them against a powerful force for nine days, when it was taken. In 1384 the same castle was betrayed to the Scots, but was recovered by Percy, earl of Northumberland, the father of Hotspur. In 1385, while an English army ravaged Scotland, the Scots broke into Northumberland, ravaged it as far as Newcastle, and took and demolished Wark, Ford, and Cornhill castles. In 1387 the Scots again entered the county and ravaged it; on their return they defeated and took prisoners Hotspur and his brother Ralph, who, at the head of a more numerous army, had attacked them at Otterburn. Earl Douglas, the Scottish commander, fell in this battle, which, it has been supposed, has furnished the subject of the old ballad of 'Chevy Chase.' It is fairly and graphically described, chiefly after Froissart, in Tytler's *History of Scotland*, vol. iii., p. 53.

The early part of the reign of Henry IV. was marked by hostilities on the border. In A.D. 1400 the Scots took and demolished Wark Castle, but were defeated at Fulhopelaw in Coquetdale; another inroad in 1402 was chastised with a similar defeat, and led to the more important battle of Homeldon, or Humbleton, near Wooler, where the earl of Northumberland, his son Hotspur, and the Scotch earl of March, defeated about 10,000 Scots under the earl of Douglas, who was taken prisoner. The revolt of the Percies and the battle of Shrewsbury (A.D. 1403) arose from the king's demanding that they should deliver up the prisoners taken at Homeldon. The town of Berwick, which was held by an adherent of the earl of Northumberland in his second revolt (A.D. 1405), was surrendered to the king's forces, as were the castles in the county held by the earl or his supporters. In the reign of Henry V. (A.D. 1419), Wark Castle was taken by the Scots, and almost immediately retaken.

In the reign of Henry VI. (A.D. 1436) a severe battle was fought at Pepperdean, just within the border of the county, not far from Cornhill, between the earl of Northumberland (the son of Hotspur), or perhaps Sir Robert Ogle, and Douglas, earl of Angus, each with about 4000 men. The English were defeated. This battle has furnished, according to some, the origin of the ballad of 'Chevy Chase,' rather than that of Otterburn; but the presence of the earl of Northumberland is not noticed by some of our authorities. In 1448 war between the two countries was resumed, and the Scots burned Alnwick.

P. C., No. 1017.

In the civil war of the Roses, most of the barons and other inhabitants of Northumberland embraced the Lancastrian party. The earl of Northumberland (the son of Hotspur) was slain in the first battle of St. Alban's, A.D. 1455, and his son Thomas Percy, lord Egremont, at that of Northampton, A.D. 1460, both fighting on that side. The next earl, son of the preceding, fell, together with his brother Sir Richard Percy, in the great battle of Towton (1461). In the year 1462, Peter de Brezé, a French captain of note, engaged by the Lancastrian party, landed with a small force in Northumberland, and was besieged by the Yorkists in Alnwick, but escaped, by the aid of the Scots, into Scotland. Next year, Margaret of Anjou, queen of Henry VI., landed near Bamborough, and took Alnwick, but withdrew on the approach of Edward IV. into Scotland. Some of her troops, being driven ashore on Holy Island, were made prisoners, and Alnwick, Bamborough, and Dunstanborough castles were taken by the Yorkists. In 1464 the queen re-entered Northumberland with a numerous army. Bamborough castle was surprised, and many of her partisans took arms in her favour. But a party of her forces was defeated at Hedgley Moor, eight or ten miles north-west of Alnwick; and the main body was utterly routed near Hexham by the Lord Montacute, Yorkist warden of the Eastern March (A.D. 1464). In the battle of Hedgley Moor, Sir Ralph Percy, brother of the last earl of Northumberland, was slain; the 'Percy Cross' marks the spot where he fell. Lord Montacute received, as the reward of his victory, the title of Earl of Northumberland and the forfeited inheritance of the Percies. The Yorkists took Bamborough and wasted the Scottish border. Berwick had been delivered up by the Lancastrians to Scotland during these troubles, but was restored to England by treaty (A.D. 1482).

In the attempts of Perkin Warbeck to dethrone Henry VII., Northumberland was invaded by that pretender, in company with an army of Scots and foreigners under James IV. of Scotland. The country was cruelly devastated, but on the approach of an English army the invaders retired (A.D. 1496). Next year James renewed his invasion, but he met with little success either in his attempts to plunder or to master the strongholds of the border. He besieged Norham with vigour, but failed to take it, and soon afterwards withdrew to his own country.

In the reign of Henry VIII. a body of 3000, or, according to some, of 8000 Scots, under Lord Hume, were cut off, on their return from a marauding incursion into the county, at Millfield, near Ford Castle (A.D. 1513). The king of Scotland, James IV., eager to revenge the defeat of his subjects, entered Northumberland the same year with a numerous army, forced the garrison of Norham to surrender upon terms, and took and partly demolished Wark, Etal, and Ford castles. While he dallied with Lady Heron at Ford Castle, the earl of Surrey, the English commander, was advancing with his son Lord Thomas Howard, lord admiral of England, Lord Daeres, and other men of note and power in the north of England, and an army of about 30,000 men: the armies met at Flodden, near the spot where Hume, whose defeat the king desired to avenge, had been overthrown. The Scots were probably more numerous by nearly 10,000 men (Tytler's *Hist. of Scotland: Notes and Illustrations*), but the mismanagement of the king ensured their defeat: James fell on the field, with the greater part of the brilliant train of nobles who had accompanied him, and probably about 15,000 men. In 1523 the county was invaded by the duke of Albany, regent of Scotland, who, with his French auxiliaries, besieged Wark Castle, while the Scots, who refused to support the invasion, remained on their own side of the river. Part of the castle was taken, but the other part held out, and ultimately the assailants were driven off. In 1524 a small force of Scots renewed the invasion, but were defeated at Brauxton; and some incursions were made in various years from A.D. 1532-1558. But the advancement of the power of England, and the establishment of better arrangements along the border, combined, with the internal dissensions of Scotland, to diminish the frequency of the Scottish inroads, and to prevent any serious invasion of the realm. In the repeated and destructive ravages of the English in the south of Scotland, Berwick was the point from which the armies usually took their departure.

In the rebellion of the northern earls of Northumberland and Westmoreland against Queen Elizabeth (A.D. 1569), Alnwick and Warkworth castles, which were held by the

earl of Northumberland's retainers, were taken by the queen's officers. The insurgent nobles passed through Hexham in their retreat from Durham into Cumberland. The assassination of the earl of Murray, regent of Scotland, whose vigorous administration had curbed the borderers, was followed by an incursion of the Scots into England (A.D. 1569), and one or two other incursions took place before the union of the two crowns of England and Scotland on the head of James I. Soon after that event, the office of lord warden of the marches fell into disuse, the garrison of Berwick was reduced, and the frontier lost its military character. It was long indeed before border feuds entirely died away; but they ceased to bear the character of national hostilities; and however national feeling might enter into them, they were treated as private quarrels or marauding expeditions.

Of these many centuries of strife and consequent misery this county contains many memorials. The ruins of Norham and Wark castles still overlook the Tweed, and those of Heton, Dudhowe, and Ford rise on the banks of the Till or its tributary streams. Nerham is the most striking ruin: the walls of the keep are now reduced to a mere shell; the apartments in the basement are vaulted; the keep is a square tower of four stories above the vaults, built of red freestone very liable to decay. The outworks have been demolished, and part of the hill on which the castle stands has been washed away by the river. Two towers of Ford Castle remain incorporated in a more modern building. Of the others there are only the earthworks and foundations, or perhaps the vaults of the basement. Nerham, Heton, and Dudhowe are in Islandshire, which belongs to Durham.

Bamborough and Dunstanborough castles are on the coast. [BAMBOROUGH.] Dunstanborough Castle is protected by steep cliffs on the north and east sides; on the south and west sides it was defended by a wall and towers, which are for the most part yet standing. The keep and other buildings of the interior, except the remains of a chapel, have disappeared. The entrance gateway on the south side is yet standing.

In the interior of the county are Alnwick [ALNWICK] and Warkworth castles, which last has been described already. Of Callaley Castle, near Whittingham, the western tower is of great antiquity: the rest of the building is more modern. Bothall Castle on the Wensbeck, Mitford, Belsay, and Harnham castles, are all near Morpeth. The picturesque ruins of Bothall, which consist chiefly of the gateway, with its flanking towers, and the outer wall of the court in which the keep stood, are on an eminence on the bank of the river. There are considerable remains of Langley Castle near Hexham, and there are ruins of Blenkinsop, Bellester, Thirlwall, and Featherstone castles, near Haltwhistle; of Staward Castle on the banks of the Allen; and of Prudhoe Castle, the ancient seat of the Umfravilles, on the south bank of the Tyne, between Newcastle and Hexham. This last is one of the finest ruins in the county; it stands on a precipitous bank of the river 60 feet high. The gateway, a lofty embattled square tower, the outer wall, and the keep are yet standing; and there are the ruins of the chapel and other buildings.

The hostility to which the county was exposed rendered it necessary for the smaller proprietors to have their dwellings strongly built; their habitations were towers, with the basement vaulted to contain the cattle of the neighbourhood when driven in for shelter. Whitton Tower near Rothbury, now converted into a rectory-house, may be taken as a specimen of these fortified dwellings. The walls are eleven feet thick at the foundation, nine feet in the kitchen, and six feet in the chambers over it. In the basement vaults is a deep well. There are the remains of other similar towers in different parts of the county.

The chief ecclesiastical antiquities of the county are noticed elsewhere. [DURHAM, County; TYNEMOUTH.] Of Hulne Abbey, for Carmelite friars, close to Alnwick, there are some remains. A tower, built by a former earl of Northumberland as a place of refuge for the monks, has been repaired, enlarged, and fitted up by a late duke of Northumberland. Brinkburn Priory near Rothbury, for regular canons of St. Augustin, has been in great part demolished. The tower of the church, part of the side walls, and several pillars and arches remain. They contain various examples of transition from the Norman to the early English styles. There are ruined churches or chapels at

Old Bewick, between Alnwick and Wooler; Memmer-kirk, in Coquetdale ward, near the border of Scotland; Bothall near Morpeth; and Jesmond near Newcastle. The ruins of the last are incorporated in a farm-house and offices.

In the troubles of Charles I.'s reign this county suffered considerably. In the first campaign of Charles against the Scots (A.D. 1439), an army of 20,000 Royalists marched northward towards Berwick, but effected nothing; in the second campaign the Scots invaded Northumberland, and advanced to the Tyne. On the 16th August, 1640, they forded that river at Newburn, a few miles above Newcastle. The Royalist infantry, from panic or disaffection, fled, and the horse were defeated with the loss of 300 men. When the war between the king and the English parliament broke out, the Northumbrians chiefly embraced the king's party. William Cavendish, marquis of Newcastle, fortified Tyne-mouth and Newcastle, and raised a regiment of Royalists at his own charge, at the head of which he fought at the fatal battle of Marston Moor (A.D. 1644). Before that battle the Scots, under Lesley, traversed the county in their march to support the Parliamentary forces, and, returning after their victory, took Newcastle by storm. The mayor, who had retired to the castle, was obliged to capitulate. Cromwell was entertained at Newcastle after his capture of Berwick (A.D. 1648), and again on his way to Scotland, just before his victory at Dunbar (A.D. 1650).

In the rebellion of 1715, the earl of Derwentwater, Lord Widdrington, and Mr. Forster, one of the county members, with several of the gentry, took up arms for the Pretender, marched to Rothbury and Warkworth, at which places they raised the standard of King James. They then marched to Morpeth, being in number about 300, partly Scots. From Morpeth they marched to Newcastle; but finding the gates shut, marched to Hexham, where another body of Scots joined them. They subsequently received larger reinforcements from Scotland at Rothbury and Wooler, under Lord Kenmore and Brigadier McIntosh. On the approach of General Carpenter from Newcastle with a body of government troops, they retired into Scotland. The subsequent transactions of the rebellion were beyond the limits of the county. From 400 to 500 of the English rebels (including 75 noblemen and gentlemen), chiefly Northumbrians, together with about 1000 Scots, were taken at Preston. Derwentwater was beheaded, Widdrington was pardoned, and Forster escaped from Newgate. In the rebellion of 1745-46 this county took no share. The inhabitants of Newcastle armed in support of the government, but were not called upon to act.

(Hutchinson's *View of Northumberland*; *Historical and Descriptive View of Northumberland*, Newcastle, 1811; Greenough's *Geological Map*; Conybeare and Phillips's *Outlines of the Geology of England and Wales*; *Parliamentary Papers*; Rickman's *Gothic Architecture*; Turner's *Anglo-Saxons and History of England*; Palgrave's *Rise and Progress of the English Commonwealth*; Hutton's *Roman Wall*; *Beauties of England and Wales*, &c.)

#### STATISTICS.

*Population.*—Northumberland may be considered as chiefly a mining county, though a large number of persons are engaged in agricultural pursuits, and some in manufactures. It is the 37th on the list of agricultural counties. Of 53,210 males twenty years of age and upwards, 1252 were engaged, in 1831, in manufactures and in making manufacturing machinery; and of this number 200 were employed at Byker, in making glass bottles and crown-glass, 150 at Newcastle-upon-Tyne, 46 at Hartley, and 28 at Newburnhall; steam-engines and machinery for the collieries employed 79 men at Newcastle and 20 at Chirton. There were about 90 iron-founders at Sugley and Long Benton. Alkali was made by 20 men at Newsham; at Hexham there were 22 wool-combers and weavers. The spinning of woollen yarn and linen thread employed about 300 persons, scattered in the villages throughout the county. Lead-mills, shot-making, the making of chain-cables, &c., give employment to a few of the population at Slesley, Wylam, North Shields, &c. There were engaged in agricultural pursuits 14,085 men, out of which number 10,441 were labourers; 13,939 men were employed as labourers in labour not agricultural.

The population of Northumberland at each of the following periods, was—

	Males.	Females.	Total.	Increase per cent.
1801	73,357	83,744	157,101	..
1811	80,385	91,776	172,161	9.58
1821	95,354	103,611	198,965	15.56
1831	106,147	116,765	222,912	12.08

showing an increase between the first and last periods of 65,811, or more than 29 per cent. on the whole population, being 28 per cent. below the rate of increase throughout England and Wales.

The following table is a summary of the population of every ward, &c., as taken in 1831.

WARDS, TOWNS, &c.	HOUSES.				OCCUPATIONS.			PERSONS.			
	Inhabited.	Families.	Build- ing.	Unin- habited.	Families chiefly employed in Agri- culture.	Families chiefly employed in trade, manufac- tures, and handicraft.	All other Families not com- prised in the two preced- ing classes.	Males.	Females.	Total of Persons.	Males, twenty years of age.
Bamborough (Ward) .	2,107	2,230	15	66	1,145	513	572	5,194	5,648	10,842	2,606
Castle (Ward) .	11,875	15,817	86	631	1,316	3,394	11,107	33,809	37,724	71,533	15,861
Coquetdale (Ward) .	3,592	4,456	17	159	1,828	1,184	1,444	10,202	10,919	21,121	5,286
Glendale (Ward) .	2,198	2,363	7	72	1,224	437	702	5,795	6,214	12,009	2,852
Morpeth (Ward) .	2,208	2,816	5	92	1,168	744	904	6,468	6,844	13,312	3,509
Tindale (Ward) .	7,508	8,628	33	297	3,282	2,128	3,218	21,082	21,333	42,415	10,832
Berwick-upon-Tweed, Town of	1,190	2,118	7	69	111	885	1,122	3,937	4,983	8,920	1,897
Newcastle-upon-Tyne, Town and County of the Town of .	5,048	9,936	50	121	53	4,961	4,922	19,660	23,100	42,760	10,367
Totals .	35,726	48,364	220	1,509	10,127	14,246	23,991	106,147	116,765	222,912	53,210

*County Expenses, Crime, &c.*—The sums expended for the relief of the poor at the four dates of—

	£.	s.	d.
1801 were	62,416	being	6 8 for each inhabitant.
1811 . .	72,821	"	8 5 "
1821 . .	77,505	"	7 9 "
1831 . .	74,092	"	6 7 "

The sum expended for the same purpose for the year ending March, 1838, was 61,446*l.*; and if it be assumed that the population increased from the years 1831 to 1838 in the same ratio as in the ten years preceding 1831, the above sum gives an average of 5*s.* 1*d.* for each inhabitant. These averages are below those for the whole of England and Wales.

The sum raised in Northumberland for poor-rate, county-rate and other local purposes, in the year ending 25th March, 1833, was 99,747*l.*, and was levied upon the various descriptions of property as follows:—

On land . . . . .	£60,921	5 <i>s.</i>
Dwelling-houses . . . . .	21,765	17
Mills, factories, &c. . . . .	12,411	1
Manorial profits, navigation, &c. . . . .	4,649	0
Total	£99,747	3

The amount expended was—

For the relief of the poor . . . . .	£73,792	5 <i>s.</i>
In suits of law, removal of paupers, &c. . . . .	4,257	14
For other purposes . . . . .	22,461	8

Total money expended £100,511 7

In the Returns made up for subsequent years the descriptions of property assessed are not specified. In the years 1834, 1835, and 1836, there were raised 93,655*l.* 8*s.*, 87,054*l.* 6*s.*, and 81,402*l.* 15*s.*; and the expenditure of each year, from 1834 to 1838, was as follows:—

	1834.	1835.	1836.	1837.	1838.
For the relief of the poor	71,983	66,405	62,809	59,363	61,446
In suits of law, removal of paupers, &c.	4,661	3,337	3,039	2,174	2,120
Payments towards the county rate	18,691	9,052	10,153	not given	6,880
For all other purposes		6,775	6,410	5,385	3,158
Total money expended	£95,315	87,570	82,402		73,304

The saving effected in the sum expended in 1838, as compared with that expended in 1834, was therefore 22,011*l.*, or 23 per cent.; and the sum expended for the relief of the poor in 1838 was less than that in 1834 by 10,537*l.*, or rather more than 14 per cent.

The number of turnpike trusts in Northumberland, as ascertained in 1836, was 14 (Acts 3rd and 4th William IV., c. 89); the number of miles of road under their charge was 479. The annual income arising from tolls and parish composition in lieu of statute duty in 1836 was 20,091*l.*,

and the annual expenditure in the same year was as follows:—

	£.	s.	d.
Manual labour . . . . .	5,546	16	0
Team labour and carriage of materials . . . . .	1,706	10	0
Materials for surface repairs . . . . .	2,519	8	0
Damages done in obtaining materials . . . . .	127	2	0
Tradesmen's bills . . . . .	540	3	0
Salaries of treasurer, clerk, and surveyor . . . . .	1,336	0	0
Law charges . . . . .	993	11	0
Interest of debt . . . . .	3,207	8	0
Improvements . . . . .	1,607	5	0
Debts paid off . . . . .	3,017	6	0
Incidental expenses . . . . .	292	6	0
Estimated value of statute duty per- formed . . . . .	1,711	19	0

Total expenditure £22,635 14 0

The county expenditure in 1834, exclusive of that for the relief of the poor, was 9,066*l.* 12*s.*, disbursed as follows:—

	£.	s.	d.
Bridges, building, repairs, &c. . . . .	3,300	10	0
Gaols, houses of correction, &c., and main- taining prisoners, &c. . . . .	2,481	10	0
Shire-halls and courts of justice, building, repairing, &c. . . . .	102	13	0
Prosecutions . . . . .	646	13	0
Clerk of the peace . . . . .	696	14	0
Conveyance of prisoners before trial . . . . .	78	8	0
Vagrants, apprehending and conveying . . . . .	43	19	0
Coroner . . . . .	126	4	0
Miscellaneous . . . . .	1,590	1	0

Total expenditure £9,066 12 0

The number of persons charged with criminal offences in the three septennial periods ending with 1820, 1827, and 1834, were 612, 570, and 719 respectively, making an average of 87 annually in the first period, of 81 in the second period, and of 103 in the third period. The number of persons tried at quarter-sessions in each of the years 1831, 1832, and 1833, in respect to which any costs were paid out of the county rates, were 27, 26, and 35 respectively. Among the persons charged with offences there were committed for—

	1831.	1832.	1833.
Felonies . . . . .	20	19	27
Misdemeanors . . . . .	7	7	6

The total number of committals in each of the same years was 27, 26, and 33 respectively.

	1831.	1832.	1833.
The number convicted was . . . . .	22	24	24
The number acquitted was . . . . .	4	—	8
Discharged by proclamation . . . . .	1	2	1
	2 T 2		



There were 159 persons charged with crimes at the assizes and sessions in Northumberland in 1838. Of these 18 were charged with offences against the person, 12 of which were common assaults; 19 were charged with offences against property committed with violence; 115 with offences against property committed without violence; only 1 was charged with a malicious offence; 5 for uttering counterfeit coin, and 1 for various misdemeanors. Of the whole number committed 130 were convicted, 22 were acquitted, 2 were not prosecuted, and no bill was found against 5. Of those convicted one was sentenced to death, whose sentence was commuted to transportation for 10 years; 24 were transported for various periods; 7 were sentenced to imprisonment for 2 years or above 1; 29 for 1 year or above 6 months; and 65 for 6 months or under; 4 were fined. Of the whole number of offenders, 112 were males and 47 females; 44 could neither read nor write, 86 could read and write imperfectly, 24 could read and write well, 1 had received superior instruction, and the degree of instruction of the remaining 4 could not be ascertained.

The number of persons registered to vote for the county members in 1837 was 8756. Of these, 4897 were freeholders, 258 copyholders, 3195 occupying tenants, 14 trustees, 28 mortgagees, and 364 annuitants; being 1 in 25 of the whole population, and 1 in 6 of the male population 20 years of age and upwards, as taken in 1831.

Northumberland contains 6 savings' banks; the number of depositors and amount of deposits, on the 20th of November in each of the following years, were as follows:—

	1832.	1833.	1834.	1835.
Number of depositors	6839	7224	6275	7356
Amount of deposits	£280,014	£286,572	£258,076	£295,118

The various sums placed in the savings' banks in 1836, 1837, and 1838, were distributed as under:—

	1836.		1837.		1838.	
	Depositors.	Deposits.	Depositors.	Deposits.	Depositors.	Deposits.
Not exceeding £20	3,335	£27,905	3,611	£34,800	3,937	£33,703
" 50	2,795	86,165	2,949	90,301	3,112	95,599
" 100	1,286	87,364	1,408	96,756	1,436	98,370
" 150	432	51,865	467	55,812	520	62,700
" 200	263	43,858	275	45,951	272	45,832
Above . . . 200	95	23,919	95	23,886	84	20,513
	8,206	321,176	8,805	344,506	9,361	356,715

**Education.**—The following summary is taken from the Parliamentary Returns on Education made in the session of 1835:—

	Schools.	Scholars.	Total.
Infant schools	5		
Number of children at such schools; ages from 2 to 7 years:—			
Males		156	
Females		153	
Sex not specified		176	
			485
Daily schools	625		
Number of children at such schools; ages from 4 to 14 years:—			
Males		11,788	
Females		8,439	
Sex not specified		3,870	
			24,097
Schools	630		
Total of children under daily instruction			24,582
Sunday-schools	218		
Number of children at such schools; ages from 4 to 15 years:—			
Males		7,057	
Females		7,070	
Sex not specified		1,748	
			16,875

Assuming that the population has increased in the same ratio as it did in the ten years preceding that time, the approximate number of children between the ages of 2 and 15 years would have been, in 1833, about 75,790; provided also the population between those ages had increased in the same proportion with the rest of the population since 1821. Six Sunday-schools are returned from places where no other school exists, and the children (139 in number) who are instructed therein cannot be supposed to attend any

other school; at all other places Sunday-school children have opportunity of resorting to other schools also, but in what number, or in what proportion duplicate entry of the same children is thus produced, must remain uncertain. Twenty schools (containing 1127 children), which are both daily and Sunday schools, are returned from various places, and duplicate entry is known to have been thus far created. Making allowance therefore, from this cause, for the want of accuracy, we may perhaps consider that not more than half of the children between the ages of 2 and 15 are under instruction.

#### Maintenance of Schools.

Description of Schools.	By endowment.		By subscription.		By payments from scholars.		Subscrip. and payment from scholars.	
	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.	Schls.	Scholars.
Infant Schools	—	—	1	150	—	—	4	335
Daily Schools	51	2362	33	2,460	505	17,002	36	2373
Sunday Schools	1	34	308	16,235	1	40	8	566
Total...	52	2296	242	18,845	506	17,042	48	3274

The schools established by dissenters, included in the above statement, are—

	Scholars.
Daily-schools	5, containing 461
Sunday-schools	53 „ 9141

The schools established since 1818 are—

Infant and other daily schools	296, containing 11,018
Sunday-schools	172 „ 13,550

Twenty-four boarding-schools are included in the number of daily-schools given above. No school in this county appears to be confined to the children of parents of the Established Church, or of any other religious denomination, such exclusion being disclaimed in almost every instance, especially in schools established by dissenters, with whom are here included Wesleyan Methodists and Roman Catholics.

Lending libraries of books are attached to 57 schools in this county.

**NORTHWICH**, a town in the parish of Great Budsworth, hundred of Northwich and county of Chester, 17 miles north-east by east from Chester, and 160 miles north-west from London, direct distances. It is situated on the banks of the Weaver, near the confluence of that river with the Dane, and its site extends over some parts of the neighbouring townships of Witton, Castle Northwich, Winnington, Marsdon, Leftwich, and Anderton, in addition to the township of Northwich. The high road from London to Liverpool passes through the town, and is there intersected by the road joining Manchester and Chester. The streets are irregular and badly paved, but lighted. Many of the houses are of considerable antiquity. The church is large, and chiefly remarkable for its semicircular choir. According to Camden (Gough, ii., p. 425) this place was called by the ancient British *Hellath du*, or the *black salt-pit*. The salt-mines in the neighbourhood are very extensive, and have been worked since 1670, if not before.

Dr. Aikin, in his 'Description of the Country Forty Miles round Manchester,' London, 4to., 1725, mentions a tradition of the inhabitants tending to prove that both the salt-mines and brine-springs were wrought during the occupation of Britain by the Romans. At the present time the productiveness of these mines probably surpasses that of any other mines in the world. The greater part of the rock-salt requires to be purified, by being dissolved in water, which is subsequently evaporated over large furnaces, before it is fit for general use. Their average annual produce is about 60,000 tons; that of the brine-springs, which are usually met with at from 90 to 120 feet beneath the surface, is about 45,000 tons. The total annual produce of the Cheshire salt-works is estimated at 156,000 tons, of which about 16,000 tons are consumed in Great Britain. Vessels of 50 to 80 tons burthen are constantly employed in transporting the salt, by means of the rivers Weaver and Mersey, to Liverpool. The reader will find much information relative to the salt-district of Cheshire in a paper by Mr. Holland, published in the first volume of the 'Transactions of the Geological Society,' and also in that gentleman's 'Survey of Cheshire,' drawn up for the Board of Agriculture. The market-day is Friday; the fairs are held 10th April, 2nd August, and 6th December. The popula-

tion of the town, in 1831, was 1481. The free grammar-school spoken of in several topographical works under the head of Northwich, is the free grammar-school at Witton, an adjoining township, to which also the church above mentioned properly belongs. The school was founded in 1558, 'by Sir John Dayn, a parson of one of the St. Bartholomews in London, and among other lands he gave unto it the Saracen's Head in the citie of Chester.' (*King's Vale Royal*, London, 1656, fol. p. 84.) A copy of the statutes, which are curious and interesting, will be found in Carlisle's 'Description of Endowed Grammar-Schools.'

(*Beauties of England and Wales; Population Returns, &c.*)

**NORWAY**, a country in Europe which comprehends the western portion of the Scandinavian peninsula, extends from 58° to 71° N. lat. Its most southern point, Cape Lindesnaes, is in 57° 58' N. lat., and the most northern, Cape Nordkyn, in 71° 8' N. lat. It lies between 5° and 28° E. long. Its length is about 1100 miles, but its width varies: the width is greatest near 61° N. lat., where it is about 250 miles wide, and smallest between 67° and 68° N. lat., where the deep inlets of the sea terminate at a distance of less than twenty miles from the boundary of Sweden. Its surface, according to Forsell, is nearly 134,500 square miles, or about 20,000 square miles more than the area of the British islands. On the north and west it is surrounded by the Atlantic, and on the south by the North Sea and the Skager-rack. East of it is Sweden, and towards the northern extremity is Russia.

By far the greatest part of this extensive country is covered with mountains, which constitute an immense rocky mass, called in the southern part *Norrskä Fiellen*, and in the northern *Kiölen*. [*NORRSKÄ FIELLEN*.] More than three-fourths of the country are above 2000 feet higher than the sea-level, and unfit for cultivation, except in a few well-sheltered places. More than half of the remaining fourth is above 800 feet higher than the surface of the sea. About one-tenth of the surface rises to the height of 800 feet, and perhaps about one-thirtieth part is below 300 feet. The lowest tract, that which does not rise to 300 feet, is situated on both sides of the Bay of Christiania. The more elevated country, that which rises to between 300 and 800 feet, partly surrounds this low tract, and partly extends along the shores of the Skager-rack, or encloses the Bay of Trondhiem on the south and east. Cultivation is nearly limited to these two regions. In all the other parts of the country cultivation occurs only in the narrow valleys by which the rocky masses are indented. A part of the mountain-masses, calculated to amount to 3284 square miles, is always covered with snow. As to the nature of the lower country see *CHRISTIANIA*; *CHRISTIANSAND*; and *TRONDHIEM*.

**Rivers, Bays, and Lakes.**—As all the rivers of this country rise at a great elevation above the sea, and have a comparatively short course, they are not fit for navigation. Some of them however are used to float down timber, at least in a part of their course. The largest of these rivers is the Glommen-elf, which rises between 62° 30' and 62° 40' N. lat., on the declivities of the Rute Fiell, in two small lakes, one of which is 3000 and the other 3627 feet above the sea-level. The two small streams which issue from them fall into the lake of Oresund, which is nearly fifteen miles long, about three wide, and 2400 feet above the sea. Flowing from this lake the river passes near the town of Röraas, and running in a south-south-western direction, skirts the base of the high peak of the Tron-Fiellet, which is nearly 3600 feet high, and then turning nearly south, it enters the cultivable region, in which it continues its southern course to Kingsvinger. At this place it turns abruptly to the west, but after running a few miles in that direction it again changes to the south-south-west, and passing through the lake of Oiern, which is fifteen miles long and about three miles wide, it enters the Skager-rack near Fredrickstad. The last of its numerous cataracts occurs near Hafs-lund, about ten miles from its mouth; it is called the Sarpe Foss (or cataract), and is sixty feet high. Below this place the river is navigable for large boats. It is remarkable that during the high floods, after the melting of the snow in spring, a part of the water of this river is discharged into lake Wenern in Sweden, by the Wrangs-elf, at the sharp turning of the river at Kingsvinger. The whole course of the Glommen probably exceeds 400 miles. Below Kingsvinger the Glommen is joined by the Wormen-elf, the outlet of Lake Mösen, which receives its waters

from the mountain-plain lying south-west of the Sneehättan, by the river Lougen. This river originates in a series of small lakes, called *Lessöevarks Vand*, west-south-west of the Sneehättan, which are more than 2000 feet above the sea, and discharge their waters by two outlets, the Romsdals-elf, which runs north-west, and the Lougen, which flows south-east. After a course of nearly 150 miles the Lougen enters Lake Mösen, which is nearly 60 miles long and from one to more than five miles wide; it is more than 420 feet above the sea-level, and lies in the middle of the best cultivated portion of Norway. The Wormen-elf runs about twenty miles with a gentle current. The Drammen-elf originates on the eastern declivity of the *Norrskä Fiellen* in two branches, the Beina-elf and the Snarum-elf. After a rapid course of more than one hundred miles the two branches unite about forty-five miles above their influx into the Gulf of Christiania, into which the Drammen-elf enters by a wide estuary called the Drammen Fiord. Much timber is floated down this river.

The other rivers remarkable for the length of their course are, the Louven-elf, the Skeen-elf, and the Otter or *Torrisdals-elf*, which run from 120 to 150 miles each; and, like the Glommen-elf and Drammen-elf, fall into the Skager-rack. No considerable river falls into the Atlantic south of the Namsen-elf, which has its mouth between 64° and 65° N. lat., and runs nearly one hundred miles through a well-wooded valley. The Alten-elf falls into the Alten Fiord, near 70° N. lat. It runs northward about one hundred miles, first through an inclined plain, but against the declivity of the plain, so that its bed sinks lower and lower below the surface of the country as it proceeds farther north. In the lower part of its course it crosses the *Kiölen Mountains* by an exceedingly deep and narrow valley, which at last becomes a mere fissure, into which no person has yet been able to penetrate. It issues from this fissure by the cataract of Pursorunka, fifteen miles from its mouth. The Tana-elf, which for the greatest part of its course forms the boundary-line between Norway and Russia, originates east of the source of the Alten-elf, and descends from a plain which declines towards the north-east, in which direction the river flows more than two hundred miles, until it approaches the Varanger Fiord, where it suddenly turns to the north and falls into the Tana Fiord, after a course of nearly three hundred miles. It is the least rapid of the rivers of Norway, but it flows through so sterile a region as to be entirely useless.

The numerous inlets of the sea by which the coast of Norway is indented, and which in several places extend seventy or eighty miles inland, would be of great advantage if the adjacent country possessed only a moderate degree of fertility. But on the shores of these inlets high and bare rocks rise several thousand feet; yet these inlets contain the only habitable places along the western coast, and abound in fish. The Fiords of Christiania and Trondhiem are an exception, being surrounded by fertile tracts: they are noticed under *CHRISTIANIA* and *TRONDHIEM*. The other inlets which are remarkable for their extent are the following, from south to north.

Bukke Fiord is wide at its entrance, and penetrates by two of its branches more than fifty miles inland. Hardanger Fiord is about seventy miles long; Søgne Fiord, which is narrow, and more than eighty miles long, is surrounded by the highest region of the *Norrskä Fiellen*. There is a great number of narrow deep fiords between Søgne Fiord and Trondhiem Fiord, and of bays farther north. The largest and widest occur at the northern extremity, where the Porsanger Fiord is 150 miles long and 20 miles wide on an average. The Laxe Fiord, Tana Fiord, and Varanger Fiord are considerable, but of less extent.

Numerous lakes occur in the southern districts of Norway, on the eastern declivity of the *Norrskä Fiellen*. Many of them are more than 2000 feet above the sea-level, and all of them are very deep. Lake Fämund, near the boundary of Sweden, is 2280 feet above the sea-level, and extends in length more than seventy miles, with an average width of more than three miles. From its southern extremity issues a river, which, under the name of Klar-elf, falls into Lake Wenern in Sweden.

**Climate.**—The climate differs considerably in the different districts of a country which extends over thirteen degrees of latitude, and on both sides of the polar circle, and also rises in the largest part of its surface to a

elevation exceeding 2000 feet above the sea. The mean temperature of Christiania is 42° Fahr., or not quite 8° less than that of London. It is probable that in the valleys near Cape Lindesnaes, where the beech grows to a stately tree, the mean temperature is higher. At Bergen, it is 46° 7', and even at Trondhiem it is 40°. The difference in the mean temperature between Christiania and Bergen may be chiefly attributed to the difference of temperature of the winter, which is severe on the eastern declivity of the Norrska Fiellen and the adjacent countries, but very mild along the western coast, on account of the prevailing western winds and frequent fogs. This is evident from the following table:—

	In Winter.	Mean temperature. Spring.	Summer.	Autumn.
Christiania	. + 25	+ 38	+ 60	+ 42
Bergen	. + 36	+ 45	+ 58	+ 48
Trondhiem	. + 24	+ 35	+ 61	+ 40
North Cape	. + 24	+ 30	+ 42	+ 32

The mean temperature of North Cape is 32°, or the freezing point, but the winter is not more severe than at Trondhiem. The greatest cold at North Cape is felt when north-easterly winds blow, but the sea is always open, and the drift-ice from Spitzbergen does not approach the coast. The violence of the winds however renders this spot nearly uninhabitable. It greatly exceeds what is felt in other northern countries, and when the wind blows no person ventures to leave his dwelling. More than two-thirds of the year are boisterous, and in autumn and winter the storms are incessant, and rage with incredible fury. On the approach of winter the snow-storms frequently last for many days and weeks. They are preceded by heavy fogs, which advance from the ocean in immense masses, like impenetrable walls or moving bodies of water; but they occur only during westerly winds. The weather is fine and clear when the wind blows from the east. The longest day lasts from the 15th of May to the 29th of July, which is two months and a fortnight; the longest night, from the 19th of November to the 26th of January, which is two months and ten days. During the long nights the aurora borealis shines with uncommon brightness, so that the fishermen are enabled to carry on their ordinary occupation just as well as by daylight. (Von Buch.) Gales are very frequent along the whole of the western coast. Thunder-storms are as common there in winter as in summer, but north of 66° thunder-storms do not occur. No traces of volcanic action are known to exist, except that lava occurs on an island not far from Bergen, and on a mountain in the Bukke Fiord fire is said to appear sometimes. Earthquakes occur, though rarely.

**Productions.**—The forests constitute the principal wealth of Norway. Beech occurs only south of 59½° N. lat.: oak, elm, and lime trees as far north as 63°; apples, cherries, and prunes are found as far as 64°, but they do not ripen every year. Gooseberries and hazel-nuts extend to 65° N. lat., and so far oats, peas, beans, and flax are cultivated. Hemp and rye are grown to 66° N. lat., and the ash and spruce-fir reach this point. Pines grow as far as 67° N. lat., but north of 67° only birch and juniper grow, and only barley and potatoes are cultivated. Extensive forests of fir and pine cover the eastern declivity of the Norrska Fiellen, and a great part of the hilly and rocky country east of the range; and it is from these regions that the greatest part of the timber is brought to the sea. On the lower country along the Bay of Trondhiem, and in the valley of the river Namsen, there are also great forests of fir and pine. Though agriculture is not neglected, the produce of the crops is not sufficient for home consumption.

Cattle and goats are numerous, but sheep are rare. The horses are of a small size in the southern districts, but larger to the north of Trondhiem: they are strong and hardy. Bears, wolves, foxes, gluttons, ermines, as well as rein-deer, elks, deer, and hares, abound. The lemming exists in great numbers, and in its migration destroys every plant in its way. [MURIDÆ, p. 501.] Different kinds of sea-fowl abound along the northern coasts, and their eggs constitute the principal food of the inhabitants of some districts during a part of the year; but they are only procured at the risk of life. In these parts the eider-duck is numerous, and the feathers are of great value for beds; a small quantity of them are exported. The sea furnishes the principal means of subsistence to the inhabitants of the western coasts; cod and herrings are most abundant, and this fishery gives occupa-

tion to many families. [BERGEN.] Salmon abounds, and is finer than in any other country in the world. Lobsters are found in the greatest abundance on both sides of Cape Lindesnaes, between Hellesund east of Christiansand and Lister Fiord north-west of Lindesnaes. They are sent to the London market. [NORTH SEA.] As to the mineral productions, see NORRSKA FIELLEN. Salt is made from seawater at some places along the Skager-rack, but not in sufficient quantity for home consumption.

**Inhabitants.**—The Norwegians, like their neighbours the Danes and Swedes, are of Teutonic origin, and speak a language which differs very little from the Swedish. It is supposed that the language of the Norwegians has undergone less change than that of their neighbours. In the most northern districts, north of 69°, there are many families of Finlanders and Laplanders: the former are here called Quäns, and the latter Finners or Finlanders. The Quäns cultivate barley and potatoes, and rear cattle. The Finners are mostly fishermen, except a certain number of families who live on their herds of rein-deer. In winter they go to Sweden.

**Political Division; Population; Manufactures; Commerce; Navigation.**—Norway was from an early period divided into four bishoprics: Christiania, Christiansand, Bergen, and Trondhiem; and afterwards, under the Danish dominion, the civil administration of the country was regulated in accordance with the ecclesiastical establishment, a civil governor, called Stifshauptmann, being appointed for every bishopric. But though the bishopric of Trondhiem has been divided into two, Trondhiem and Nordland, both continue to constitute one civil administration. Norway is subdivided into seventeen bailiwicks or districts, the extent and relative population of which appear in the following table, which is formed from that which is given in Forsell's 'Statistik von Schweden.'—

Names of the Districts.	Area in English square miles.	Population.	Number of Inhabitants in a sq. mile.
Smaalehnenes	1,625	62,921	39
Aggerhuus	2,028	90,216	44
Hedemarkens	10,475	77,929	7
Christians	10,367	90,903	9
Buskereds	5,269	76,669	11
Iarlsbergs and Laurvigs	943	54,516	58
Bradsbergs	6,121	63,139	10
Nedenaes	4,685	45,842	10
Mandals	2,247	54,252	24
Stavangers	4,672	62,859	13
Søndre Bergenhuus	6,918	104,471	15
Nordre Bergenhuus	8,372	69,778	8
Romsdals	6,532	70,174	11
Søndre Trondhiems	7,808	77,714	10
Nordre Trondhiems	9,541	57,791	6
Nordlands	16,570	57,791	4
Finmarkens	30,236	33,394	1
	134,309	1,150,000	

Of this population only 124,917 individuals live in towns, and 1,025,083 are dispersed over the country. Perhaps less than half the population gain their subsistence chiefly by cultivating the ground. The remainder employ themselves chiefly in the fishing of cod, herring, salmon, and lobsters, and in preparing the produce of the forests for the market, and in working in the mines. The manufacturing industry is comparatively very small. The most numerous manufacturing establishments are saw-mills, the erection of which is much facilitated by the rapid course of the numerous rivers, even near the sea-shore. There are also several iron and copper works, potash-houses, glass-houses, powder-mills, nail-forges, and two salt manufactories. Linens and coarse woollen cloths are made by the country-people for home consumption. In Christiania and Trondhiem there are some manufactories of cloth, cotton stuffs, and tobacco; there are also a few sugar-houses and tanneries.

The foreign commerce is considerable, as the greatest part of the produce of the forests, the fisheries, and mines is sent out of the country. The timber goes almost exclusively to Great Britain, and consists of planks, deals, and masts of excellent quality, and also tar, to which lately fire-wood has been added as an important article. The produce of the fisheries goes partly to Spain and the Mediterranean, to which places the cod is sent [BERGEN], and partly to the Baltic, where the herrings find a ready sale, and partly to England, especially the lobsters, which, as already observed,

are sent to the London market. Iron is not exported, there being hardly sufficient for home consumption, but copper is exported from Trondhiem to Holland. Cobalt goes to Hamburg and Holland. Minor articles of exportation are furs and eider-down. This commerce is almost entirely carried on in Norwegian vessels. The inhabitants are excellent seamen, a great number of them being occupied during the greatest part of the year, and during the coldest season, in fishing off the Lofoden Islands. The country supplies all the materials for ship-building. The frugality of the Norwegians qualifies them to be the carriers for other countries, so that their vessels frequently visit countries with which they have no direct commerce.

**History and Constitution.**—The Norwegians first appear in history as pirates, who frequently visited and laid waste the countries bordering on the North Sea. Norway was then governed by a great number of small princes, whose ambition led them to continual wars. When there was no opportunity of satisfying their passion for war at home, they sailed to the neighbouring countries for the purpose of enriching themselves by plunder, and thus acquiring greater influence in their own country. They discovered and settled Iceland. In the second half of the ninth century (875) the small kingdoms were united under King Harold Harfagra, and from that time they became still more troublesome to their neighbours, until Norway was connected with Denmark, and then the Norwegians accompanied Svenno and Knut to the conquest of England. But the two kingdoms were soon separated again, and remained so till 1387, when Margaret became queen of Denmark and Norway. From that time till 1814 both countries remained united, and Norway was administered by a governor, appointed by the king of Denmark. By the convention of Kiel, agreed to on the 14th of January, 1814, between Denmark and Sweden, Norway was ceded to the king of Sweden. A Danish prince, Christian Frederic, who was governor of Norway at that time, and had succeeded in gaining the affections of the nation, made an attempt to constitute Norway a separate kingdom. For that purpose he called together a national assembly at Eidsvold, where, on the 17th of May, the outlines of the present constitution were laid down. On the 16th of August he assembled the legislative body, or Storting, in Christiania. But the Swedes soon entered the country with an armed force, and the prince, who had assumed the title of king, was obliged to abdicate the royal dignity on the 7th of October. On the 20th of the same month the union of Norway and Sweden was determined in the Storting, and the constitution received its present form on the 4th of November, 1814. On the 31st of July, 1815, it was promulgated as the fundamental law of the country, and was assented to by the Swedish legislature on the 6th of August. In this way both countries were united under one king, though their constitutions differ widely from one another.

The legislative body, or Storting, is composed of the representatives of the people. They are not however elected immediately by the people, but by electors who are chosen by the citizens. In the cities 50 citizens, and in the country 100, elect one elector. The electors unite and choose the representatives, either from among themselves or other persons. The number of the representatives must not be less than 75 nor above 100: two-thirds must be chosen by the electors of the country, and the remaining third by those of the cities. The representatives must be thirty years of age and must have resided in Norway not less than ten years. The members of the state council and the persons employed in state offices cannot be representatives, nor can those who belong to the royal household: but clergymen are eligible. The king or his lieutenant opens the Storting, immediately after which it separates into two bodies, the Lagthing (or legislative body) and the Odelsting (assembly of landed proprietors). The Lagthing consists of one-fourth of the members of the Storting chosen by the whole assembly. The Storting is empowered to abolish old and to enact new laws, to impose taxes or abolish or change them, to determine the civil list of the king and the salaries of the persons employed by government, &c. Every bill must originate in the Odelsting; it may be proposed by a member or by one of the state councillors. When the bill has passed, it is brought into the Lagthing, who may adopt or reject it. In the latter case it is returned to the Odelsting, with the reasons for such rejection. When a bill has twice passed the Odelsting, and has been twice

rejected by the Lagthing, both bodies unite and decide the matter in question by a joint vote. If two-thirds are not in favour of the bill, it is rejected. When a bill has passed the legislative bodies, it is sent to the king, whose signature gives it the force of law. If the king does not assent, he sends the bill back, observing only that he does not think it useful. In this case the matter cannot be discussed in the same Storting; but the following Storting may pass the same bill, and the king has a right to reject it a second time: but if the third Storting pass the bill, it becomes a law, whether the king sign it or not. The law by which nobility was abolished in 1821 received the king's signature after having passed in three Storthings. The Storting meets once in three years, on the 1st February, and the session cannot last more than three months. The members are only chosen for one Storting. The king may in the interval convoke an extraordinary Storting, consisting of those persons who were members of the last regular Storting.

The executive power is vested in the king. The Storting does not interfere in any way with his arrangement of the department of war. But before the king declares war he must inform the council of state at Christiania of such proposed step. This council is composed of a minister of state, seven state councillors, and a secretary of state, all of whom must be natives of Norway. When the king is not in Norway, the minister and two of the councillors are with him, and the others, who remain in Norway, govern the country in conjunction with the governor, who must not be a Norwegian, but may be a royal prince, in which case he is called viceroy. When the king has informed the Norwegian government of his intention to declare war, he assembles the Norwegian and Swedish councillors of state, explains to them the motives which compel him to take such a step, and asks their opinion. The opinion of each member is taken down in writing, and the decision of the matter is left to the king.

The Odelsting may examine the proceedings of the council of state, and, if there is reason for it, bring it or any member of the body to a trial. The Lagthing, united with the supreme court of justice residing at Christiania, constitutes the court which has jurisdiction in such a case.

(Von Buch's *Travels through Norway and Lapland*; Everest's *Journey to Norway, Lapland, and part of Sweden*; Laing's *Journal of a Residence in Norway*; Schubert's *Reise durch Schweden, Norwegen, Lapland, Finnland, und Ingermannland*; Forsell's *Statistik von Schweden*.)

**NORWICH**, a city and county of itself, in the county of Norfolk, of which county it is the capital: 97 miles north-east of London, in a direct line; 118 miles by the mail-road through Bishop Stortford, Newmarket, Bury St. Edmund's, and Thetford; or 113 miles by the other mail-road through Chelmsford, Colchester, and Ipswich. It is in 52° 7' N. lat. and 1° 16' E. long.

Norwich is not mentioned in history before the time of the earlier Danish invasions. It appears to have risen gradually from the decay of Caister or Castor St. Edmund's, now an inconsiderable village about three miles south of Norwich, but antiently a British and subsequently a Roman town under the name of Venta Icenorum. An old distich records that

'Castor was a city when Norwich was none,  
And Norwich was built of Castor stone.'

It is probable indeed that during the time of the Romans the site of Norwich was covered by the waters of the estuary or arm of the sea which at that time penetrated with its many ramifications the eastern coast of the island, and extended, it is likely, to or beyond the town of Venta. [NORFOLK.] By the gradual accumulation of alluvial matter, islands were formed in this estuary, and its waters were divided into several channels. It is probable that even as late as the period of the Norman conquest what is now the lower part of the city consisted of such islands. During the existence of the separate kingdom of the East Anglians [NORFOLK], their kings had erected, upon what was then a promontory on the shore of this estuary and is now the Castle Hill, a royal fortress; and as it is probable that by this time the branch of the estuary which flowed up to Venta either was dry or had become so shallow as to be little available for navigation, the merchants and fishermen deserted Venta to seek new abodes under the protection of the castle, and thus formed a town which, from its situation relative to their former town, obtained the name of North-wic (wic, in Latin *vic-us*, a habitation, or group

of habitations), the northern station or town. Norwich became a place of some importance under the Anglo-Saxon princes, and had a mint. Blomefield, in his 'History of Norfolk,' vol. ii., p. 4, notices the coins of several Saxon princes, Alfred, Athelstan, Edmund I., Edred, Edward the Martyr, and Ethelred II. The circumstance of Alfred coining money here is remarkable, as at the date of this coinage (about 872, according to Blomefield) the government of East Anglia could only have just come into his hands, upon the extinction of the East Anglian dynasty in the person of St. Edmund, and the country either was or had just been in the military possession of the Danes. In the invasion of the Danes under their king Sweyn, A.D. 1004, Norwich was taken and much injured by them. It soon however recovered from this blow, and was in the time of Edward the Confessor a flourishing town, having 1320 burgesses and twenty-five parish churches. It may be questioned if at this time it was exceeded in wealth and population by any place in England, except London, and perhaps York. In the Conqueror's time the castle of Norwich was entrusted to Ralf de Guader, earl of Norfolk; but he rebelling against the king (A.D. 1075), and being defeated, took shipping at Norwich and fled into Bretagne. His wife, who valiantly defended the castle, was obliged to capitulate. The constableness of the castle, with the earldom of Norfolk, was then conferred on Roger Bigot, or Bigod, to whom, on strong presumptive evidence, the erection of the present keep has been ascribed. On the accession of William Rufus the city was damaged by this earl Roger Bigod, who held the castle for Robert of Normandie, William's elder brother. On the peace of 1091, Roger was pardoned and retained his offices. In his time and probably by his encouragement the bishopric of the East Angles was removed from Thetford to Norwich (A.D. 1094), and the foundations of the cathedral were laid by Herbert Losinga, or Losinga, the bishop. The Conquest and the rebellion of Guader had however materially injured the town, for at the Domesday Survey (A.D. 1086) the number of burgesses was only about half the number in the Confessor's time. Henry I. granted the citizens a charter (A.D. 1122), and soon after this the Flemings began to settle here, and introduced the worsted manufacture. The castle remained (except for a short interval in the reign of Stephen) in the hands of the Bigod family, until the reign of Henry III. Hugh Bigod, being in the interest of young Henry, son of Henry II., took the city by assault (A.D. 1174), with the aid of a body of Flemish troops. Henry II., to reward the loyalty of the citizens who had resisted this attack, restored or confirmed their privileges by a charter which is still extant, and which is one of the oldest in the kingdom. In the time of King John, Roger Bigod having joined the insurgent barons, Norwich Castle was seized by the king. Soon after John's death it was taken by the dauphin Louis, but on the peace which followed his departure, it was restored to the Bigod family, by one of whom, about A.D. 1224, the castle was surrendered to the crown. It was subsequently committed to the charge of the sheriff of Norfolk and Suffolk. In the early part of the same reign (A.D. 1220) the citizens had received authority to fortify their city, but they did not act on the permission till long after (A.D. 1294), and the fortifications were not fully completed till above a century afterwards; and in the mean time, in 1267, the insurgent barons took and plundered the place and did great damage. The walls of the city were embattled, with twelve gates and forty towers. In 1272 great disturbances broke out between the monks and clergy and the citizens, in consequence of the disputed jurisdiction of part of the city, and on account of these disturbances several citizens were executed, and the city for awhile lost its charter. In the reign of Edward III. the Flemings settled here in considerable numbers, and carried on the worsted manufacture. In the reign of Richard II. (A.D. 1381) the popular tumults which agitated nearly the whole country broke out in Norfolk, and the mob entering Norwich, and being headed by John the Litester, or Dyer, committed great outrages, until they retired to North Walsham, on the approach of Henry Spencer, the warlike bishop of Norwich. [NORFOLK.] In A.D. 1403 Henry IV. separated the city of Norwich from the county of Norfolk, and made it a county of itself. During the subsequent reigns the city does not seem to have advanced in prosperity, and in the reign of Edward VI. (A.D. 1549) it suffered from the rebels under Ket, the tanner of Wymondham. [NORFOLK.] In the earlier years of Elizabeth's reign the Flemings, who fled from the perse-

cutions of the duke of Alva, settled at Norwich to the number of 4000, and much increased the prosperity of the town by the introduction of the bombazine manufacture. In the civil war of Charles I. Norwich sided with the parliament; and as the king had no party in this district, no contest took place. No public event of interest has occurred since that period.

The county of the city of Norwich extends about four miles from north to south, and as many from east to west; the town itself is not exactly in the centre of this district, but rather to the north-east, and extends about a mile and a half in length from north-west to south-east, and from three-quarters of a mile to a mile in breadth. It is of irregular form, and very irregularly laid out. The streets are narrow and winding; some of them follow the line of the ancient walls, which are partly standing, though the ditches have been filled up and the gates pulled down. Those parts of the walls which remain are in very dilapidated condition; in other parts they have been entirely demolished and the site built upon. The town stands on a considerable space of ground for its population, the houses being much intermixed with gardens, so that it has been designated 'a city in an orchard.' The market-place is one of the most spacious in England. The streets are paved, lighted with gas, and watched under the provisions of a local act, and the principal streets have flagged footpaths. Many of the houses and other premises are well built; the best are in the market-place and its vicinity; those situated in the precincts of the cathedral are large and handsome, and are chiefly occupied as private residences. The increase of buildings has been of late years very considerable, principally on the west side of the town. The modern parts are well built. The river Wensum enters Norwich on the north-west side, and winds partly through, partly round the town, until it finally leaves it on the south-east side: it is crossed by at least ten bridges in the town or close to it. The county of the city contains forty-four parishes or hamlets, and part of a forty-fifth (Sprowston); of these, thirty-three are entirely comprehended in the town; the remaining twelve are partly or altogether in the rural portion of the county.

The most interesting of the public buildings are the castle and the cathedral. The site of the former was probably occupied by the castle of the East Anglian kings: it is a natural eminence, augmented perhaps by the earth thrown out from the excavations made at or preliminary to its re-erection by the Normans. The antient and present state of this castle was described by Mr. Wilkins of Norwich (*Archæologia*, vol. xii., pp. 145, et seq.), A.D. 1795, and more recently (A.D. 1834) by Mr. J. W. Robberds, also of Norwich. It had three nearly circular concentric lines of defence, each consisting of a wall and ditch, enclosing a ballium or court: beside these there were the keep, the only part now standing, in the innermost ballium; and a barbican, or outwork, to defend the entrance. The whole comprehended an area of not less than twenty-three acres. The outer ditch has been filled up from time immemorial, but some faint traces may yet be observed at some points. The middle ditch was more recently levelled, and the traces of it remain in the descent of 18 or 20 feet in some private yards. (Wilkins.) The inner ditch and the bridge over it still remain: the ditch is enclosed by an iron palisade, and planted with ornamental shrubs and trees, in the midst of which stands a newly-erected shire-hall, in the Tudor style. The bridge is 150 feet long, and has one arch of 40 feet span (or 43 feet, Wilkins): it is supposed to be the largest and most perfect arch remaining of what has been popularly but erroneously termed Saxon architecture. The wall of the innermost ballium has been long destroyed, but there are the remains of two round towers, part of the original gateway at the inner end of the bridge. The area of the inner ballium is level, but, from its superior elevation, commands an interesting view of the city and surrounding country. Round its verge there is a public walk, at the foot of a modern wall, faced with granite and capped with battlements of freestone, which, except where interrupted by the keep, encloses the central part of the area. In this central part is the keep, a substantial quadrangular building, the western and southern sides of which are upon the line of the enclosing wall, and are consequently open to the public walk. The keep is 110 feet 3 inches from east to west, including a small tower, through which was the principal entrance: from north to south it is 92 feet 10 inches; its height to the battlements is 69 feet 6 inches. The interior



comprehended two floors, a basement 24 feet high, with walls in one part 13 feet thick, faced with flint, and almost destitute of ornament. The upper part is faced externally with stone, and is much ornamented. The building maintains its antient form externally, but the architectural ornaments are much impaired by time: the inner part has been so much altered, in order to adapt it to the purpose of a gaol, to which it has been long applied, that the original arrangement of the apartments can scarcely be traced. The entrance tower, of richly ornamented Norman architecture, known as Bigod's Tower, has lately been restored. The eastern front has also been renovated, but is partly hidden by the incongruous addition of a modern county gaol. Mr. Wilkins ascribes the erection of the keep to the Anglo-Danish king Canute; but later writers, on better ground, ascribe it to Roger Bigod.

The foundation of the cathedral was laid, A.D. 1094, by Herbert Losinga, or Lozinga, the bishop in whose time the see was removed from Thetford to Norwich; but he finished only the choir and tower: succeeding bishops added the other parts of the building: the spire was added by Bishop Percy, A.D. 1361. Losinga laid the foundations of a Benedictine monastery at the same time as those of the cathedral; the monks of this monastery were engaged in frequent contests with the citizens, and in these conflicts the cathedral received considerable damage. The monastery was completed in 1101: its revenues at the dissolution were 1050*l.* 17*s.* 6*d.* gross, or 978*l.* 19*s.* 4*d.* clear. A few traces of the buildings remain.

The cathedral consists of a nave with side-aisles, two transepts without aisles or columns, a choir occupying part of the nave and the area under the tower, an unoccupied space east of the choir, a chancel with two side-aisles continued round the circular east end of the choir, several chapels, a tower and spire at the intersection of the transepts with the nave, and a cloister, nearly perfect, on the south side of the church. The length of the whole building from east to west is 411 feet; the breadth at the transepts 191 feet; the breadth of the nave and side-aisles is 71 feet. The cloisters, with the included space, form a quadrangle with the sides not quite parallel, but averaging between 175 and 176 feet each. The height of the tower and spire, with the weathercock, is 313 feet. The plan is almost wholly Norman; the east end and some of the chapels are circular. Compared with some other cathedrals, that of Norwich is small in size and meagre in embellishment, but it comprises many forms and features of singular and unique character. There has been a lady-chapel eastward, but it is now destroyed. The exterior of the cathedral in many parts presents a decayed appearance, from the loose and friable character of the stone of which it was built; and buildings or other incumbrances prevent it from being seen to advantage on any side except the west. The nave, central tower, and eastern portion present a continued line of Norman work of excellent character: the east end is a very fine composition: in its aisles are some good Norman groined roofs; and the tower, both inside and outside, presents one of the best specimens of ornamented Norman extant. The architecture of the nave is very bold, and the arches of the triforium are very large. There are various insertions of later styles: the destroyed lady-chapel was of early English; the spire is of decorated English or early perpendicular; the cloisters present a series of work from early decorated to perpendicular, and a considerable portion of the west front is of perpendicular character. There is a fine font, and various portions of the screen-work and several of the monuments deserve attention. The chapter-house has been destroyed. There is a good doorway, and some lavatories of good work in the cloisters.

On the north side of the cathedral and connected with it is the episcopal palace, a large and irregular edifice, built by different prelates; there are in the garden some remains of the antient hall of the palace, now in ruins. Near the west end of the cathedral is the free school (formerly the charnel-house), containing some good antient work; and not far off are two antient gates, St. Ethelbert's Gate, of decorated English character, and the Erpingham Gate, of late perpendicular; both valuable specimens of their respective styles.

The parish churches of Norwich are more numerous than in any other city in England except the metropolis; they amount to thirty-six. Some of them are valuable specimens of antient architecture. Those of St. Bennet, St. Ethelred, and

St. Julian have round towers: these towers are usually considered to be of early Norman date, but their original openings have been so disturbed by alteration, that their period and style cannot be exactly ascertained. Several of the other churches retain portions of good antient work amidst much mutilation and addition. The church of St. Michael Coslany is of mixed character; part is early English and part of perpendicular character; in the latter the tracery mouldings and other embellishments are carved in stone, and the interstices filled up with flints. The churches of St. Andrew, St. George Colegate, St. Giles, St. John Sepulchre, St. Lawrence, St. Michael at Plea, St. Saviour, and St. Stephen are all handsome churches, of perpendicular character, some of them with lofty and elegant flint and stone towers. But the most conspicuous church is that of St. Peter Mancroft, a large and fine perpendicular church, with a lofty tower and handsome windows. There are some other buildings which are the remains of ecclesiastical edifices. The nave of the church belonging to the monastery of the Dominican or Black Friars is now the common hall of the city, called St. Andrew's Hall; the choir, long used as the Dutch or Walloon church, with the convent kitchen, dormitory, infirmary, and other parts, were lately used as a workhouse. St. Giles's Hospital (popularly the Old Man's Hospital) comprehends portions of the antient church of St. Helen's. There are numerous dissenting places of worship.

The Guildhall is a large old building, erected in the fifteenth or sixteenth century, and since repaired or altered; it includes convenient courts for holding the city assizes and sessions, and contains some good paintings and some other articles of interest. The new city gaol is a massive and appropriate building; there is also a bridewell; the shire-hall, in the castle ditch, is a brick building in the Tudor style, cased with cement; the new county gaol, in connexion with the castle, is a commodious building.

The following shows the increase of the population of the county of the city of Norwich in the course of the present century:—1801, 36,832; 1811, 37,256; 1821, 50,288; 1831, 61,116. The population in 1831 comprehended 529 families, chiefly engaged in agriculture, 9153 in trade and manufactures, and 4848 not included in either of the above classes. The number of houses in 1835 was 14,201, of which 13,132 were inhabited and 1069 uninhabited. The number of houses rated to the poor was 4525, of which 1271 were rated under 10*l.* a year; 1978 above 10*l.* and under 20*l.*; 768 above 20*l.* and under 40*l.*; and 508 at 40*l.* and upward. The most important trade of the town consists of the manufacture of silk and worsted into shawls, crapes, bombazines, damasks, camlets, and imitations of the Irish and French stuffs. These manufactures are chiefly carried on by hand-loom and at the habitations of the workmen. There are however some manufactories. These branches of industry have recovered of late years from the depression under which they had long laboured (of which depression 1811 was the middle point): nearly 3800 adult males were engaged in them in 1831. There are three yearly fairs, and two weekly markets, viz. on Wednesday and Saturday; the latter, which is the principal, is a great market for corn and cattle. The corn-market is held in a large handsome building, 'the Corn Exchange,' erected for the purpose, and the cattle-market is in an open area adjacent to the castle. Trade in agricultural produce, coal, and other heavy goods is carried on by means of the river, chiefly in lighters of from fifteen to twenty tons burden. Since the 30th September, 1833, Norwich has been accessible to sea-borne vessels of small tonnage. To facilitate the approach, an entrance has been made from the sea into the navigable channel of the Waveney, by Lake Lothing, and a ship-canal from the Waveney to the Yare or Wensum. There is another short canal near Norwich. These various cuts with the river are navigable for vessels not exceeding ten feet draught of water. The harbour, lock, and sluice at the sea entrance of this navigation are extensive works. The assizes and quarter-sessions for the county of Norfolk are held at Norwich.

Norwich claims to be a borough of prescriptive origin. The corporation has however received many charters from successive kings. Before the late Municipal Reform Act it comprehended a governing body of a mayor, 24 aldermen, and 60 common councilmen, with the usual officers, and nearly 3500 freemen. By the Municipal Reform Act the borough was divided into eight wards, and has 16 aldermen and 48 councillors. The city has returned

two members to parliament from the time of Edward I. The constituency in 1835-36 comprehended 4102 electors, freemen or 10/-householders. The limits of the borough, both for municipal and parliamentary purposes, comprehend the county of the city, and have been no further altered than by the addition of some extra-parochial districts within the boundary. Norwich is the principal place of election and a polling-station for the eastern division of the county of Norfolk.

The benefices in the city amount to thirty-four: they are, with one exception, in the archdeaconry of Norwich, and are all small, only two exceeding 200*l.* yearly value; a very few are provided with glebe-houses.

There were in 1833, in the county of the city, thirty-eight infant or dame schools, with above 900 children; twelve boarding-schools, with above 300 children; and one hundred and twenty day-schools of all kinds (including national and other charity schools), with 5200 scholars; giving in all one hundred and seventy schools, with about 6400 children in them, or about one-tenth of the population of the county of the city at the time. There were forty-four Sunday-schools of all classes, giving instruction to about 4400 children.

There are several dissenting places of worship. The charitable institutions and charities are very numerous. (*Reports of Charity Commissioners.*) The Norfolk and Norwich Hospital, a large and elegant building of red brick, erected in 1771, can receive above a hundred patients. It is partly supported by a triennial musical festival in St. Andrew's Hall. The Norfolk and Norwich Lunatic Asylum is at Thorpe, about two miles from the city. There are a dispensary, an eye-infirmary, a lunatic hospital, an asylum and school for the blind, and several hospitals or almshouses for the indigent: St. Giles's hospital, the Boys' and Girls' hospitals, and Doughty's hospital are the chief of these. St. Giles's hospital (of which the management is in the corporation) has estates worth nearly 6000*l.* a year. There are a master and 165 inmates, besides servants. The free grammar-school is maintained out of this endowment.

Of institutions for the promotion of knowledge, the Norfolk and Norwich Literary Institution is the chief. It has a valuable well-selected library, for which a fine new building has been erected or is now erecting. The Norfolk and Norwich Museum is kept in the building connected with this institution, but is an entirely separate establishment. There is an annual exhibition of paintings by a society of artists. There are two newspapers published at Norwich. The Norwich Union Fire and Life Insurance Offices are institutions of considerable importance.

(*Rickman's Gothic Architecture; General History of the County of Norfolk*, Norwich, 1829; Stark and Robberds' *Scenery on the Rivers of Norfolk*; Britton's *Norwich Cathedral and Architectural Antiquities; Parliamentary Papers.*)

**NORWICH, DIOCESE OF.** Upon the establishment of Christianity among the East Angles, in the reign of Sigebert, Felix, a Burgundian (ob. A.D. 647), was made the bishop of the newly-converted people, and the see was fixed at Dunmoe or Dunmok, now Dunwich, then an important town, and perhaps the residence of the king. The limits of the diocese appear to have been those of the kingdom; and these may be considered as on the whole indicated by those of the present diocese, making some allowance for the variation which may be supposed to have taken place in the course of many centuries. The subsequent changes of the diocese are noticed elsewhere. [NORFOLK.]

The diocese includes the counties of Norfolk and Suffolk, except four parishes in the latter county, viz. Hadleigh, Monks Illeigh, and Moulton, peculiars of Canterbury, and Freckingham, a peculiar of Rochester; it comprehends also sixteen parishes in the county of Cambridgeshire, which appear to have belonged to the East Anglian kingdom, while the rest of that county belonged to Mercia, and is now included in the diocese of Ely.

There was formerly but one archdeaconry for the whole diocese; there are now four, as follows,—Norwich (the original one), Norfolk (established A.D. 1200), Sudbury (A.D. 1126), and Suffolk (A.D. 1127). These four comprehend 46 rural deaneries and 1356 parishes.

It is proposed by the Church Commissioners (Third Report) to transfer the Cambridgeshire parishes, with the deanery of Fincham, in the archdeaconry and county of Norfolk, the deanery of Lynn, in the archdeaconry of Norwich and county of Norfolk, and the deaneries of Fordham,

Clare, and Thingo, in the archdeaconry of Sudbury and counties of Cambridgeshire and Suffolk, to the diocese of Ely. The revenues of the bishopric were formerly very considerable, but were much diminished by Henry VIII. The net yearly income of the see was, in 1831, 5395*l.* No alteration has been proposed in the income. The bishops have always possessed greater liberties than any other bishops in England, and they sit in the Upper House not only in right of their barony, but also as titular abbots of St. Bennet in Holme. The bishop of Norwich is the only abbot in England.

The corporation of the cathedral consists of a dean and six prebendaries; there are also six minor canons (three of whom hold respectively the offices of precentor, sacrist, and librarian), a gospeller, and an epistoller. The net revenue of the church, in 1831, was 5245*l.*, of which the greater part was shared among the dean and prebendaries.

**NORWICH, AMERICA.** [CONNECTICUT.]

**NORWOOD, RICHARD**, a mathematician of the earlier part of the seventeenth century, of whose personal history we know nothing. He is principally famous for having been one of the first who measured a degree of the meridian with any accuracy. His method was this:—in the year 1635 he measured the distance between London and York, taking the bearings as he proceeded along the road, and reducing all to the direction of the meridian and to the horizontal plane. The difference of latitude he found by observation of the solstices to be 2° 58', and from that and his measured distance he concluded the degree to be 367,176 feet English, or 57,800 toises. This has been found to be a near approximation, but his method was necessarily not capable of much accuracy, nor did he measure the distance in the best manner: 'Sometimes,' says he, 'I measured, sometimes I paced, and I believe I am within a scantling of the truth.' He is the author of the following works:—1. 'Trigonometry, or the Doctrine of Triangles,' 4to., 1631, 1685; 12mo. 1651, 1667, 1669. 2. 'Fortification, or Architecture Militaire,' 4to., 1639. 3. 'The Seaman's Practice, containing the Mensuration of a Degree of the Earth,' 4to., 1637, 1655, 1667, 1668, 1678. 4. 'Epitome' being the application of the doctrine of triangles in certain problems concerning the use of the plain Sea Chart, 8vo., 1674. 5. 'Logarithmic Tables,' 12mo., n. d. He also published letters and papers, in the 'Philosophical Transactions,' on the tides, on his mensuration of an arc of the meridian, and on other subjects of minor importance.

**NOSE** is one of the external apertures of the respiratory system and the organ for the sense of smell. The portion of the nose by which odours are perceived lies deep back in the cavity to which the external apertures of the nostrils lead; the portion which is prominent upon the face serves merely as the apparatus for inhaling the air which is impregnated with the odour. The most essential parts of the organ are the olfactory nerves, which come off from the olfactory bulbs of the brain [BRAIN], and passing through numerous holes in the ethmoid bone, which is situated between the orbits and above and behind the nostrils, ramify on the extended surfaces of that bone and the turbinated bones which form on each side the chambers of the nose. The sensitive terminations of the nerves are placed on the surface of a delicate and very vascular membrane which lines the whole cavity of the nose, and which is constantly kept moist by the secretion of a small quantity of mucus, in which the odoriferous particles are caught and for a time retained.

The sense of smell varies considerably, both in degree and in kind, in different animals. It is evidently possessed by insects and many others of the lower animals, but the organs by which they exercise it are unknown. In the higher animals its degree of acuteness is in general marked by the extent of surface of the ethmoid and turbinated bones, over which the olfactory nerves are distributed. In man this surface is proportionally smaller than in other animals, in most of which, besides occupying the greater part of the interior of the face, it is increased by peculiar branchings and convolutions of the thin layers of the bones. Each species has also a sense of smell in some degree peculiar to itself; thus herbivorous animals, though possessing the most delicate power of discerning the differences of vegetable odours, have no evident faculty of discriminating those of most animal substances; while the carnivora, on the other hand, can scarcely distinguish any others than the last. Each species has a fine sensibility for those sub-

stances which are of the greatest importance to its own existence, and thus obtains at once a knowledge of their presence in places concealed from all the other senses. Man possesses the sense of smell for a very large number of substances, but not in a very acute degree for any of them. The difference appears the greater between him and other animals in consequence of the neglect of the exercise of this sense which is common (except for particular purposes) in civilised society; but the American Indians and some of the northern Asiatic tribes, by their constant practice in hunting, are said to have acquired a power of scent scarcely inferior to that of the dog.

The olfactory nerve is appropriated exclusively to the sense of smell, and is incapable of perceiving pain or any other sensation. Of the peculiarities by which in different animals it is capable of perceiving only certain odours, we know no more than of the nature of those odours themselves, of whose existence we have no other evidence than that of the sense which they affect.

The sense of smell serves as an adjunct to that of taste, and is subservient in most instances to the same purpose, of providing proper and avoiding injurious food for the sustenance of the body. By it many animals seek out their food, and all select from that which they obtain; and much of that compound sensation which we regard as taste is really due to the smell, as, for instance, the sensation of the flavour of aromatic substances, which is completely lost by closing the nostrils while we are eating them.

For the full perception of odours it is necessary that the particles charged with them should be drawn with some force into the nose, and we may stand for some time in a very strongly smelling atmosphere without perceiving it, if we breathe only through the mouth. The most acute sensation is obtained by the sudden inhalation of a large quantity, or by a succession of short and quick inspirations.

**NOSTRADA'MUS, or NOTRE DAME, MICHEL**, a singular personage, who appears to have enjoyed some reputation as a physician, but is now only remembered as the author of the most celebrated predictions published in modern times, was descended from a noble\* family in Provence, and was born at St. Rémy, a small town in the diocese of Avignon, on the 14th of December, 1503. His father was a public notary; his paternal grandfather was astronomer and physician to René, count of Provence and titular king of Sicily and Jerusalem; and his maternal grandfather (from whom he acquired the elements of the sciences and mathematics) was also astronomer and physician to John duke of Calabria, the son of king René. After having finished his courses of humanity and philosophy at Avignon, he went to study medicine at Montpellier, but was driven away by the plague in 1522. For more than four years he travelled about in the south of France, and stayed some time at Toulouse and Bordeaux, during which period he seems to have paid particular attention to botany, and also to have undertaken the treatment of all such patients as were willing to put themselves under his care. He then returned to Montpellier, took the degree of doctor of medicine in his twenty-seventh year (1529), and then again proceeded on his travels. At Agen he remained four years, and married. Here too he became acquainted with Julius Cæsar Scaliger, with whom he appears to have been intimate, and whom he calls a Virgil in poetry, a Cicero in eloquence, and a Galen in medicine; and declares that he owed more of his scientific attainments to him than to any other person. After the death of his wife and two children whom he had by her, he left Agen, and went first to Marseille, and then (in 1544) to Salon, where he married a second time.

Two years afterwards, the plague having broken out at Aix, he was invited thither by a public deputation from the inhabitants, and was of so much service (particularly by means of a powder of his own invention, of which he has given the formula in the eighth chapter of his treatise 'Des Fards'), that he received a pension from the town during several years after the cessation of the disease. He has left upon record a curious instance of the modesty of the women of Aix, who, as soon as they perceived themselves attacked by the contagion, began to sew themselves up in

their winding-sheets, in order that their naked bodies might not be seen after their death.

The next year (1547) he was sent for to Lyon on a similar occasion, and appears to have succeeded equally well. On his return to Salon, where he was less esteemed than elsewhere, he employed part of his leisure time in composing some medical works, chiefly consisting of receipts and preparations. It was about this time that he first began to represent himself as divinely inspired, and endowed with the gift of prophecy. His predictions were first written in prose; but, upon revising them afterwards, he thought they would look better if expressed in verse, and accordingly he threw them all into the form of quatrains, and then arranged them in three Centuries. When this was done, he was in some doubt about the safety and propriety of publishing the work; but as the time of many of the events foretold in his predictions was near at hand, he at last resolved to print them. The first edition was published at Lyon (1555), and appeared with a dedication to his son Cæsar, then an infant. As might be expected, the work was very differently received by different persons; at home he was generally considered an impostor, but in other parts of France he was looked upon either as a person really and truly inspired by God, or else as one who held communication with the devil. However Henry II. and his superstitious mother Catherine sent for him to Paris, received him at court very graciously, made him a present of two hundred crowns, and sent him to Blois to see the king's children there, and to try to find out their future destinies. The result of this visit is not known, but it is certain that Nostradamus returned to Salon loaded with honours and presents. Encouraged by his success, he increased his quatrains to the number of a complete thousand, and published a new edition of them, with a dedication to the king, in 1558. The next year that prince received a wound at a tournament, of which he died, and it was thought that so unusual an accident could not have been omitted in Nostradamus's predictions; accordingly his book was immediately consulted, and in the thirty-fifth quatrain of the first century were found the following lines:—

'Le lion jeune le vieux surmontera,  
En champ bellique par singulier duel  
Dans cage d'or les yeux lui crevera.  
Deux plaies une, puis mourir; mort cruelle.'

So remarkable a coincidence greatly increased his fame, and he was honoured shortly after with a visit from Emanuel duke of Savoy, and his wife the princess Margaret of France. Charles IX., on a progress through Provence, sent for him, and upon his complaining of the slight respect in which he was held by his fellow-townsmen, publicly declared that he should hold the enemies of Nostradamus to be his own. He afterwards presented him with a purse of two hundred crowns, together with a brevet constituting him his physician in ordinary, with the same appointment as the rest.

Nostradamus died about sixteen months after, July 2, 1566. He was buried at Salon, in the church of the Cordeliers, under a monument inscribed with an epitaph asserting in the most confident terms his prophetic skill. After his death two more Centuries were collected from his papers, &c., and added to his quatrains, and the whole work was translated into various foreign languages. Since that time his pretensions to the gift of prophecy have been variously estimated; most persons probably consider him to have been either an impostor or a lunatic, and attribute the fulfilment of some of his predictions to chance; others have accused him of magic, from which charge he is defended by Naudé, in his 'Apologie pour les grands Hommes soupçonnés de Magie'; while some of the believers in animal magnetism have classed him among other 'crisiques' who exercised 'la faculté physique de prévision somnambulique et de prévoyance ou clairvoyance instinctive.' (*Archives du Magnétisme Animal*, t. viii.)

Even in 1806 there appeared at Paris a work by Théodore Bouys, with the following singular title: 'Nouvelles Considérations sur Nostradamus et sur ses Prédications concernant: 1, la Mort de Charles I., Roi d'Angleterre; 2, celle du Duc de Montmorency, sous Louis XIII.; 3, la Persecution contre l'Eglise Chrétienne en 1792; 4, la Mort de Louis XVI., celle de la Reine, et du Dauphin; 5, l'Élévation de Napoleon Buonaparte à l'Empire de France; 6, la Longueur de son Règne; 7, la Paix qu'il doit procurer à tout le Continent; 8, sa puissance, qui doit être un jour aussi grande sur mer qu'elle l'est actuellement sur terre

\* According to some authorities he was of Jewish descent, and his biographers, after deciding that he was of the tribe of Issachar, applied to him the following words from 1 Chron. xii. 32—'Of the children of Issachar were men that had understanding of the times, to know what Israel ought to do.' (*Archives du Magnétisme Animal*, t. viii.)



9, enfin, la Conquête que ce Héros doit faire de l'Angleterre.' The (so called) prediction of the death of Charles I., mentioned in the above title-page, is one of the most singular in the whole collection; it occurs in the forty-ninth quatrain of the ninth century, and is as follows:

'Gand et Bruxelles marcheront contre Anvers;  
Sénat de Londres mettront à mort leur Roi;  
Le sel et le vin lui seront à l'envers;  
Pour eux avoir le règne en désarroi.'

In the dedication of his work to Henry II. he predicts that the Christian church will suffer from a cruel persecution: 'et durera ceste cy jusques à l'an mille sept cent nonante deux, que l'on cuidera estre une renovation de siècle.' the latter part of this sentence is certainly remarkable when we recollect that the French republic dated its existence from September 22, 1792; and that in all public acts time was reckoned from that day as from the commencement of a new æra.

The 'Centuries' of Nostradamus have been frequently reprinted, and numerous commentators have endeavoured to explain his predictions. The best editions are those of Lyon, 1568, 8vo., and Amsterd., 1668, 12mo. Of Commentaries (besides that of M. Bouys, already noticed) the most celebrated are: 'Commentaire sur les Centuries de Nostradamus,' par Chavigny, Paris, 1596, 8vo.; 'Concordance des Prophéties de Nostradamus avec l'Histoire,' par Guynaud, Paris, 1693, 12mo.; 'La Clef de Nostradamus,' par un Solitaire, Paris, 1710, 12mo., and an English translation, with notes, by Theophilus de Garencières, Lond., fol. 1672.

Before he wrote his 'Centuries' Nostradamus had published during several years an almanac, containing predictions about the weather, &c., besides a few other works, of which only the names are now remembered: 'Traité des Fardemens,' Lyon, 1552; 'Des Confitures,' Anvers, 1557; both contained in 'Opuscul de plusieurs exquis Receptes, divisé en deux parties,' Lyon, 1572, 16mo.; 'Le Remède très utile contre la Peste et toutes Fievres pestilentielle,' Paris, 1561, 8vo.; 'Paraphrase de Galien, sur l'Exhortation de Ménodote aux Etudes des Beaux Arts,' Lyon, 1588, 8vo.

For more particulars of the life and works of Nostradamus see 'Abrégé de la Vie de Michel Nostradamus, par Palamède Trone de Condroulet, de la Ville de Salon,' 4to., no date; his 'Life,' by Haize, Aix, 1712, 12mo. Adelung has given him a place in his 'Histoire de la Folie Humaine,' vii. 105.

This article cannot better end than with the famous Latin distich composed on his name, which has been attributed to Jodelle and to Beza:—

'Nostra damus, cum falsa damus, nam fallere nostrum est;  
Et cum falsa damus, nil nisi nostra damus.'

NOTA'MIA. Dr. Fleming gives this name to a group of the great genus Sertularia of Linnæus. [CELLARIEÆ.]

NOTARY. This word is derived from the Roman name *notarius*, a person who was so called from his taking down in notes or writing (notæ) the words of a speaker. The *notarii* were in fact short-hand writers, and it is clear from many passages of antient writers that they used symbols of abbreviation. It may be sufficient to quote the two following passages:—

'Hic et scriptor erit felix cui litera verbum est,  
Quique notis linguam superet cursuque loquentis,  
Excipiens longas nova per compendia voces.'  
Manilius, *Astronom.*

'Currant verba licet, manns est velocior illis,  
Nondum lingua suum, dextra peregit opus.'  
Martial, *Epig.*, xii. 208.

It seems that they were also employed to take down a man's will in writing. The *notarii* were often slaves. The word is also sometimes used to designate a secretary to the princeps or emperor. (Ausonius, *Epig.*, 136; Gregor. Nazianz., in the letter inscribed *ῥῆ Norapiῶ*; Augustin, lib. ii., 'De Doctrina Christiana,' Dig. 29, tit. 1, sec. 40; Lamprius, *Alex. Sev.*, 28; see also the references in Faccioliati, *Notarius*.)

In the fourth century, the *notarii* were called *Exeptoires*, and were employed by the governors of the Roman provinces to draw up public documents. But the persons mentioned under the later Roman law, who corresponded most nearly to the modern notary, are called *tabelliones*; their business was generally to draw up contracts, wills, and other instruments. The forty-fourth Novel treats specially of the *tabelliones* (*περὶ τῶν συμβολαιογράφων*); and they are spoken of in various other parts of the Novels, and in the Code. (*Cod. xi.*, tit. 53, &c.) It appears clear that as the word *notarius* is the origin of the modern term notary, so

the *tabellio* is the person from whom were derived the functions of the modern notary public.

It is impossible to say when persons under the name and exercising the functions of notaries were first known in England. Spelman cites some charters of Edward the Confessor as being executed for the king's chancellor by notaries. (*Gloss. tit. Notarius*.) 'Notaries,' are mentioned with 'procurators, attornies, executors, and maintainours,' in the stat. of 27 Edward III., c. 1. They were officers or ministers of the ecclesiastical courts, and may therefore have been introduced into this country at a very early period. It is generally supposed that the power of admitting notaries to practice was vested in the archbishop of Canterbury by the 25 Hen. VIII., c. 21, s. 4. The term of service and the manner of admission to practice are now regulated by the 41st Geo. III., c. 79, which prescribes that no person in England shall act as a public notary or do any notarial act unless he is duly sworn, admitted, and enrolled in the court wherein notaries have been accustomedly sworn, admitted, and enrolled. He must also have been bound by contract in writing, or by indenture of apprenticeship, to serve as a clerk or apprentice for seven years to a public notary, or to a scrivener using his art and mystery according to the privilege and custom of the city of London, and also being a notary, who has been duly sworn, admitted, and enrolled. An affidavit of the execution of the contract must also be made and filed, as the act prescribes, in the proper court, and the affidavit must be produced and read at the time of the person's admission and enrolment as a public notary, in the Court of Faculties, which is the proper court for admitting and enrolling notaries. The proper persons for taking and filing the affidavits are the master of the faculties of the archbishop of Canterbury, in London, his surrogates or commissioners. Persons who act as notaries for reward, without being properly admitted and enrolled, are liable for every offence to forfeit and pay the sum of 50*l.*; but British consuls abroad are empowered to perform notarial acts (6th Geo. IV., c. 87, s. 20). The licence or commission for acting as a notary in England requires a stamp duty of 30*l.*, and in Scotland one of 20*l.* The annual certificate is the same as for attorneys. By the 3rd and 4th William IV., c. 70, the provisions of the act of 41st Geo. III., so far as relates to the apprenticeship for seven years, are confined to the city of London and liberties of Westminster, the borough of Southwark, and the circuit of ten miles from the Royal Exchange in the city of London; and the master of the Court of Faculties of the archbishop of Canterbury is empowered to appoint, admit, and cause to be sworn and enrolled in the Court of Faculties any attorney, solicitor, or proctor, not residing within the above-mentioned limits, to be a notary public, to practise within any district in which the master of the faculties shall see good reason for making such appointment. Notaries public who practise within the jurisdiction of the incorporated company of Scriveners of London must become members of and take their freedom of that company under the act of the 41st Geo. III.

The original business of notaries was to make all kinds of legal instruments; they are often spoken of in former times as the persons who made wills (Shepherd's *Touchstone*, vol. ii., 407, Preston's ed.); but the attorney, solicitor, and conveyancer have now got possession of this part of their business. In practice their business is now limited to the attestation of deeds and writings for the purpose of making them authentic in other countries, but principally such as relate to mercantile transactions. It is also their business to make protests of bills of exchange. They also receive and take the affidavits of mariners and masters of ships. Notaries are mentioned with sergeants-at-law, barristers, solicitors, attorneys, and others (44th Geo. III., c. 98, s. 13), as the persons who may, for fee or reward, draw or prepare conveyances or deeds relating to real or personal estate, or proceedings in law or equity. A recent act (5th and 6th William IV., c. 70, s. 5) provides that in cases of such actions or suits being brought in any court of law or equity within any of the territories or dependencies of Great Britain abroad, as in the act mentioned, public notaries, with other persons named in the act, are authorised to receive solemn declarations in writing, in the form prescribed by the act; and such declarations, when certified under their signature and seal, and transmitted, shall be allowed in all such actions and suits to have the same force as if the persons making the declarations had appeared and sworn or affirmed the matters therein contained in open court, or

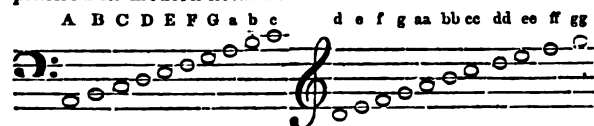
upon a commission issued for the examination of witnesses.

**NOTARCHUS.** [TECTIBRANCHIATA.]

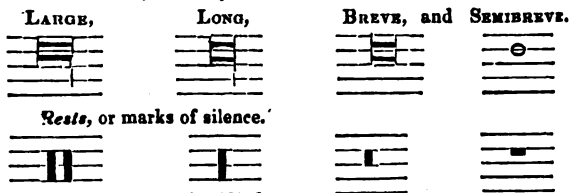
**NOTATION.** [SYMBOLS.]

**NOTATION**, in Music, signifies the method whereby the pitch, or tune, and duration of musical sounds are represented, and by which definite periods of silence, called *rests*, are marked:—it is to music what letters and punctuation are to language.

To show the pitch, the Greeks used the letters of their alphabet, placed in various positions. [Music, p. 24.] The Romans had recourse to the majuscules of their own alphabet for the same purpose, till the latter part of the sixth century, when St. Gregory, or Pope Gregory I., employed the seven first capital Roman letters for the first septenary, beginning with the A answering to the lowest space in our base clef. For the next ascending septenary he used the corresponding small letters; and the third he denoted by the same small letters doubled. Example, explained in modern notation:—



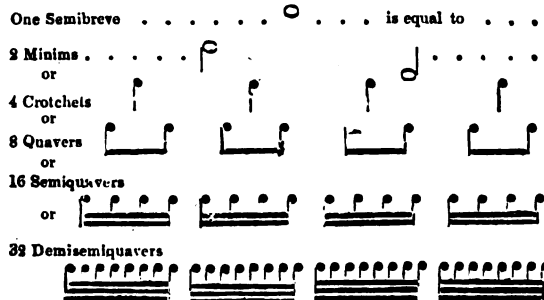
Guido, early in the eleventh century, introduced, it is commonly supposed, the use of points instead of letters, which he placed on parallel lines, giving names to the latter by means of letters, which have since been gradually transformed into those signs called clefs. [GUIDO; GAMUT; CLEF.] The dots however of Guido only marked the degrees of high and low; to Franco of Cologne we are indebted for characters which at once denoted both the tune and time of the sounds. [Music, page 26.] Of these he invented four, and their rests; namely, the



These were valued or measured by the semibreve. The breve was equal to two semibreves, the long to four, and the large to eight. [LONG, &c.] The invention of the Minim, Crotchet, Quaver, and Semiquaver, is ascribed to John de Muris, a doctor of the Sorbonne, who made this important addition to notation, and also originated certain characters determining the measure, in the year 1338. The Demisemiquaver first appeared in the seventeenth century, and, about the middle of the last, was divided into halves. Latterly it has been subdivided into quarters, and even into eighths, most unnecessarily, and greatly to the perplexity of the performer, and, consequently, to the detriment of the art, by wantonly, and with an affectation at once vulgar and mischievous, throwing difficulties in the way of its attainment.

We have not been able to ascertain at what time the sharp and flat were brought into use. The sharp was at first square in form, according to Butler (*Principles*, &c., 1636). The flat was always a small *b*. The natural is, comparatively, of modern date. Till towards the close of the seventeenth century, the secondary use of the sharp was to contradict the flat, and of the flat to contradict the sharp. The natural, introduced at nearly the same time, relieved the two other characters from part of their duty. In the printed score of Lully's opera, *Persée*, dated 1684, the natural does not appear; nor even in his *Armide*, published in 1710. In Purcell's *Diocletian* (1691) sharps and flats contradict each other; but the natural is occasionally used. [SHARP; FLAT; NATURAL.] The grouping of quavers, &c. by means of ligatures, or ties, joining the stems, is also one of the improvements made in the latter half of the seventeenth century. It does not seem to have been practised in 1653, when Lawes printed his 'Ayes,' &c. In Lully's *Proserpine* (1680) we find quavers tied at the bottom of their stems, in groups of four, but semiquavers are all detached. The use of bars became general about the middle of the seventeenth century, though this mode of division was partially adopted much earlier. [BAR; ABBREVIATIONS; DOT; NOTE; TIME.]

**NOTE**, in Music, a character which, by its place on the staff, represents a sound, and by its form determines the time or continuance of such sound. There are six notes in ordinary use,—the Semibreve, Minim, Crotchet, Quaver, Semiquaver, and Demisemiquaver. To these may be added the Breve, yet met with in sacred music; and the half-Demisemiquaver, much used, and often unnecessarily, by the moderns. [BREVE; SEMIBREVE, &c.] The value, or length in time, of the Semibreve may be considered as unity; the minim is  $\frac{1}{2}$ , the crotchet  $\frac{1}{4}$ ; the quaver  $\frac{1}{8}$ ; the semiquaver  $\frac{1}{16}$ , and the demisemiquaver  $\frac{1}{32}$ . Hence is formed the following *Table of Proportions*, as it is denominated:—



And hence it will also appear, that one minim is equal to two crotchets, &c.; one crotchet, to two quavers, &c., &c.

The word **NOTE** is frequently used as a synonym of sound; thus we say a high, low, loud, or soft *note*; or, the *note* A; a flat *note*, &c. Some confusion occasionally arises out of this double meaning; but the musical nomenclature is very imperfect, and any attempt to improve this or any other branch of the art meets with little support from its professors.

**NOTES, BANK.** [BANK—BANKER—BANKING.]

**NOTHING.** In the article **INFINITE** will be found as much upon this word as will enable us to dispense with the consideration of the symbol 0 as the limit approached but never attained by the continual diminution of magnitude.

Among the terms used in mathematical language are *nothing*, *cipher*, and *zero*. The etymologies of the two latter terms are explained under those heads: their meanings are somewhat different. The first word, *nothing*, implies the absence of all magnitude, but its occurrence denotes either that magnitude did exist, or might have existed, or does exist under similar circumstances in other problems, or in the same problem under different points of view. Were it not for this, the word would be useless: thus we do not consider it necessary to speak of £20 generally as twenty pounds, no shillings, no pence, and no farthings. But if this £20 had been the amount of a number of sums, the symbol £20 0 0 would be useful as indicating that the results of an operation (addition) had left no quantities in places where beforehand quantity might have been expected. The term *unity* would have been useless in the same manner, except as a tacit reference to other units; anything we please is *one* of its kind, and accordingly the indefinite article (a or an), which is certainly *one* in etymology, has lost its definite monadic signification, because such signification is useless. This point is of some importance to the mathematician, as justifying a use of the symbol 0 where it might seem redundant. The 0 and 1 are frequently useful as symbols of distinction where they are not wanted as symbols of operation: in like manner, in common language, the simple phrase 'one ox and no sheep,' though it implies no more of positive conception than the more simple phrase 'an ox,' may be a proper description where the second would be no such thing.

The *cipher* is 0 considered in a purely arithmetical point of view, as the mode of denoting a blank column intervening between or following columns which contain significant numbers.

The term *zero* considers 0 rather as a starting point of magnitude than as the symbol for the recognition of absence of all magnitude, and really denotes, not the entire absence of magnitude, but the arbitrary determination, to reckon all magnitudes by their excess or defect from a certain zero magnitude. Thus the zero point of the thermometer does not mean that shown when there is no temperature, but a certain temperature, that of freezing water; and degrees above and below zero indicate excesses or defects of tem-

rature above or below that standard. It is then perfectly proper to say that ten degrees below zero is a lower temperature than five degrees, and that both are less than zero. Whenever magnitude is considered in connection with modifications, the zero and even the nothing of such magnitude may require to be considered with similar modifications, even though all absolute magnitude is lost. Straight lines, for example, admit of consideration with reference not only to their lengths, but also to their positions and directions. Let the straight lines diminish each by an approach of one extremity towards the other, and position and direction still always distinguish each line from the others, though all be of the same linear magnitude (length): when the one extremity actually reaches the other, length is destroyed, but one indication of position still remains, the fixed extremity, or what was the fixed extremity as long as the line has length. Different points (*nothings* of length) still tell something about the positions of the different lines which left them; and there are as many *nothings* of length (distinguishable) as there are different points in space. These zeros, as it might be proper to call them, are of most essential consequence, as zeros, in the complete method of connecting the explanations of symbols in algebra (in the widest sense of the term) with those of the restricted or arithmetical sense. [NEGATIVE QUANTITIES.] All direction however has disappeared when a line is reduced to a point; and considerations arising out of this, the principles of which appear in FRACTIONS, VANISHING, will be applied in the article TANGENT.

It might seem as if, in the consideration of the term zero, we had commenced an explanation of negative quantities, and had obtained a justification of the phrase *less than zero*, if not of *less than nothing*. This may be true to a certain extent, too limited however for the purposes of algebra, and not sufficiently expressive of the actual meaning of the words. When the distinction of positive and negative quantities is explained and adopted, the terms greater and less are no longer used in their simple arithmetical meaning, but take a wider signification, such as will allow old theorems of arithmetic to remain true under the same phraseology as before. After an express extension of signification has been accorded to these terms, it is not wonderful that uses of them should be perfectly allowable which could not be made if we retained the old significations. Those who use the extended meanings, without fully understanding and admitting them, will make a mystery of algebra: those who refuse to make the extensions, and yet charge others who do not refuse with falling into all the absurdities which extended uses without extended meanings present to themselves, are precisely in the condition of the honest tar who asserted that the French were such fools as not to know the difference between a cabbage and a shoe (*chou*). But those again who, professing to use extended meanings, do not take care to make their logic conformable to them, but neglect to distinguish between premises which are true of one set of meanings and not of the other, will fall into such mistakes as would be made by him who should conclude that blood is salt water, because both circulate in arms (of the human body and of the sea).

Admitting the scale of positive and negative numbers, ... -3, -2, -1, 0, +1, +2, +3, ... it is obvious that on the right of 0, on which we have quantities common to pure arithmetic and algebra, we pass from the greater to the less by moving our eyes from right to left; while on the left we have no meaning at all of greater and less yet established. Let us agree then that we are to pass from what we will call the greater to what we will call the less by passing from right to left in all cases; and there is no mystery in our meaning when we say that all negative quantities are less than 0, and that -10 is less than -5.

But is this convention a purely arbitrary one? We answer that it rather bears the character of interpretation [INTERPRETATION] than of convention. Having new modes of quantity, with corresponding extensions of addition and subtraction, we are rather to ask what greater and less *ought* to mean than what, with liberty of choice, we shall make them mean. The great characteristics of greater and less (or more and less) in arithmetic are, that the more you add the more you get, and that the more you take away the less you leave, and *vice versa*. The preceding extensions of greater and less are the only ones which will allow of these theorems remaining universally true. Thus

$$3+(-5)=-2, \text{ add more, and } 3+(-4)=-1,$$

and -1 is greater than -2. Again, -5-(-12)=7, subtract less, -5-(-13)=8, and 8 is greater than 7.

It is however to be remembered, though no rule has been laid down upon the subject, that it may be gathered from the practice of writers that the term *smaller* does not accompany *less* in its extended meaning. The former term is particularly used in the Differential Calculus to denote an approach to 0, which in a negative quantity is algebraic increase, and in a positive quantity diminution. And many, perhaps all writers on the Differential Calculus, are lax in their use of all the comparative terms, sometimes employing them in the algebraical and sometimes only in the arithmetical sense. The inconvenience is not very great, as a student must have learned to contend with greater difficulties than those of an unexplained use of dubious terms, before he is able to make his way to the higher mathematics. But it may be useful to give him a hint that, in reading works of analysis, he would do well at first always to stop for a moment when the word greater or less occurs, and ask himself whether the problem requires and allows the extended signification or not, and to make some mark of distinction in every place. This will at once ensure the soundness of the first reading, and facilitate the second.

NOTHING, DIFFERENCES OF. This name is given to certain numbers which are used in so many different theorems that it is worth while to tabulate them, and to consider them as fundamental numbers of reference. They were first specifically noted in this point of view by the late Bishop Brinckley. We shall here confine ourselves to a description of their derivation, an expeditious mode of calculating them, a table of some of their values, and one instance of their use.

If we take a series of terms  $a, b, c, e, \&c.$ , and form the successive differences of  $a$  [DIFFERENCES, CALCULUS OF], the symbols  $\Delta a, \Delta^2 a, \&c.$ , have a meaning which refers to the excess of  $b$  above  $a, \&c.$  If then  $a$  should happen to be  $=0$ , the symbols  $\Delta 0, \Delta^2 0, \&c.$ , may stand for finite quantities: for instance in—

$$\begin{array}{r} 0 \\ 2 \\ 5 \\ 9 \\ 14 \end{array} \begin{array}{r} 2 \\ 3 \\ 4 \\ 5 \\ 6 \end{array} \begin{array}{r} 1 \\ 0 \\ 0 \\ 1 \\ 0 \end{array} \&c. \quad \Delta 0=2, \quad \Delta^2 0=1.$$

But as the preceding series is a set of values of  $\frac{1}{2}x(x+1)-1$ , in which the first term is 0 ( $x=1$  gives  $\frac{1}{2}1.2-1$ ), it would be necessary in using several series beginning with 0, to make marks of distinction between  $\Delta 0$  in one series, and that in another. The most useful case is that in which whole and positive powers of 0, 1, 2, 3, &c. form the series in question: thus if we take the series of cubes,

$$\begin{array}{r} 0^3=0 \\ 1^3=1 \\ 2^3=8 \\ 3^3=27 \\ 4^3=64 \\ 5^3=125 \end{array} \begin{array}{r} 1 \\ 7 \\ 12 \\ 19 \\ 27 \\ 36 \end{array} \begin{array}{r} 6 \\ 6 \\ 6 \\ 6 \\ 6 \end{array} \begin{array}{r} 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{array} \quad \begin{array}{l} \Delta .0^3=1 \\ \Delta^2 0^3=6 \\ \Delta^3 0^3=6 \\ \Delta^4 0^3=0, \&c. \end{array}$$

The symbol  $\Delta^m 0^n$ , whenever  $m$  is greater than  $n$ , stands for 0; when  $m$  is  $=n$  it stands for  $1 \times 2 \times 3 \times \dots \times n$ . In all other cases the differences of  $0^{n+1}$  may be found from those of  $0^n$  by the following equation:—

$$\Delta^r 0^{n+1} = r \left\{ \Delta^{r-1} 0^n + \Delta^r 0^n \right\}$$

It is frequently useful to have the term  $\Delta^r . 0^n \div 1.2.3 \dots (r-1).r$  arranged in tables. If we wish to make this separately, we have, denoting the preceding fraction by  $\Delta(r).0^n$

$$\Delta(r).0^{n+1} = \Delta(r-1).0^n + r \Delta(r).0^n - 1$$

The following table contains both the differences, and the differences divided, as just explained, up to those formed from the series of tenth powers; arranged so that simple differences must be looked for above or on the dotted lines, and divided differences below the dotted lines; the first by means of the left hand column and highest row; the second by the right hand column and lowest row. Thus—

$$\begin{array}{l} \Delta^5 0^8 = 126000 \\ \Delta^6 0^7 = 15120 \end{array} \quad \begin{array}{l} \frac{\Delta^5 0^8}{2.3.4.5} = 1050 \\ \frac{\Delta^6 0^7}{2.3.4.5.6} = 21 \end{array}$$

$n$	$\Delta$	$\Delta^2$	$\Delta^3$	$\Delta^4$	$\Delta^5$	$\Delta^6$	$\Delta^7$	$\Delta^8$	$\Delta^9$	$\Delta^{10}$	$n$
10	1	1022	55980	818520	5103000	16435440	29635200	30240000	16329600	..3628800	1
9	1	510	18150	186480	834120	1905120	2328480	1451520	..362880	1	2
8	1	254	5796	40824	126000	191520	141120	...40320	3	1	3
7	1	126	1806	8400	16800	15120	...5040	6	7	1	4
6	1	62	540	1560	1800	....720	10	25	15	1	5
5	1	30	150	240	....120	15	65	90	31	1	6
4	1	14	36	....24	21	140	350	301	63	1	7
3	1	6	...6	28	266	1050	1701	966	127	1	8
2	1	...2	36	62	2646	6951	7770	3025	255	1	9
1	..1	45	750	880	22827	42525	34105	9330	511	1	10
$n$	$\Delta^{10}$	$\Delta^9$	$\Delta^8$	$\Delta^7$	$\Delta^6$	$\Delta^5$	$\Delta^4$	$\Delta^3$	$\Delta^2$	$\Delta$	$n$

The only one not in the table is  $\Delta^{(7)} 0^*$  which is always unity.

The uses of these differences mainly consist in the rapidity with which transformations can be made by means of them, whether of a simple algebraical or of a transcendental kind: such as the following,  $n$  being a whole number:—

$$x^n = x + \Delta^{(2)} 0^n \cdot x(x-1) + \Delta^{(3)} 0^n \cdot x(x-1)(x-2), \\ + \&c.$$

$$x^3 = x + x(x-1),$$

$$x^3 = x + 3x(x-1) + x(x-1)(x-2),$$

$$x^4 = x + 7x(x-1) + 6x(x-1)(x-2)$$

$$+ x(x-1)(x-2)(x-3),$$

and so on. [See also OPERATION, SERIES.]

The following works contain many properties of these numbers: Herschel, 'Examples of the Calculus of Finite Differences,' *passim*; and *Lib. Useful Knowl.*, 'Differential and Integral Calculus,' pp. 253-261, and 307-311.

#### NOTHURUS. [TETRAONIDE.]

NOTICE is a term used in English law with reference to various kinds of transactions. That use of it which is most important, and which it is here proposed to explain, has reference to contracts of buying and selling, and mainly so far as such contracts come under the cognizance of courts of equity. In this sense notice signifies the knowledge of a party to the contract of any fact which is connected with the contract, and may become a matter of dispute either between the parties to the contract, or between them or any of them and any other person not a party to that contract. The term notice is most commonly applied to buying and selling of land, or some interest in land, and the matter generally in dispute is, whether the interest of a person who is not a party to the contract is in any way to be affected by it.

Notice, in English law, is an ambiguous term, and has different meanings according as we contemplate the giver or the receiver of what is called notice. To give notice is to communicate something to another person: the person who receives the communication, is said to *have* notice, and when it is proved that he has had such notice, he is presumed to have knowledge of the thing communicated. Thus notice comes to have the meaning of *knowledge* when applied to him who is the receiver of the notice; and it is not always easy to avoid the ambiguity resulting from this double meaning of the word.

Notice of a fact (notice being here considered with reference to the receiver) may mean either knowledge of the fact itself, or knowledge of some other fact from which arises a legal presumption of knowledge of the fact itself. In both cases the knowledge must be proved by evidence, and the only difference in the evidence is this; in the former case a fact is to be proved, which fact, when proved, shall be considered knowledge; and in the second case a fact is to be proved, which cannot be considered as knowledge, but is a fact the establishment of which leads to a legal presumption, that is, to an inference of some fact which is considered as knowledge. If a man receive a written communication from another person of a certain demand upon him by such person, all that can be proved by evidence is that he did receive such communication; but that fact being established, all the world imputes to the receiver of such communication knowledge of the demand contained in it. The fact, in order to have any relation to the contract, must of course be such a fact as would affect the contract if it were expressly made part of it. A fact of this kind then being established, which is either knowledge or legal presumption of knowledge, the legal conclusion is, that the person who had such knowledge at the time of making the

contract must be considered as having acquiesced in such fact; in other words, such fact must be considered to have the same effect as if it were expressed in and incorporated with the contract.

Notice has been divided by writers on English law into 'actual' and 'constructive.' 'Actual notice,' it is said, 'requires no definition;' and 'constructive notice, in its nature, is no more than evidence of notice, the presumptions of which are so violent that the court will not allow even of its being controverted, but it is difficult to say what will amount to constructive notice.' (Sugden's *Vendors and Purchasers*.) It is not stated by this writer what actual notice is, and since his remarks on constructive notice are equally applicable to actual notice, he has in fact made no distinction between the two kinds of notice. In addition to what has been said on the general subject of knowledge, we may take an instance of what would be called actual notice in English law. We will suppose this actual notice to be a statement in writing made by a person interested in a certain piece of land and in the course of the treaty for the purchase of it, and by him handed to the purchaser. Now it is obvious that all this, when proved, does not make the knowledge of the purchaser; but these facts, when proved, are evidence of knowledge, 'the presumptions of which are so violent' that the universal consent of mankind 'will not allow even of its being controverted.' There is then no further distinction between actual and constructive notice, considered as a matter belonging to the general subject of evidence, than what has been already stated; and the only question which can arise in any system of law is, what facts, not capable of being considered as knowledge, shall be considered, when proved, as leading to a legal presumption of such facts as may be considered knowledge.

These general principles will be better understood by their application to particular cases, in English law, of buying and selling land. But it should be premised that there are cases of what is often called notice, in English law, where no knowledge of anything is proved, but the existence of a certain thing is proved, and then notice is legally imputed to the person to be affected by it. Thus, when there is a public act of parliament, every body is legally supposed to have notice of it. But this is notice which arises from positive law, and is not presumed from the proved knowledge of another fact; it would therefore be more appropriate to give it some other name, and not to confound it, as some text writers do, with that which they call constructive notice. Another example of such notice made by positive law is, where there is a suit pending\* which may affect the subject of sale; in this case the purchaser is also said to have notice of it, and he buys subject to what may be decreed in the suit. All conveyances by any bankrupt *bonâ fide* made and executed before the date and issuing of the fiat are valid, notwithstanding any prior act of bankruptcy committed by the bankrupt, provided the person to whom the conveyance is made had not at the time of such conveyance notice of any prior act of bankruptcy committed by the bankrupt.

Where facts are proved to be known to a man which are sufficient to make him inquire further, he is considered to know all that he might have known if he had made inquiry. For instance, if a man buys an estate which is in the possession of a tenant, notice of such possession is notice of any lease or other interest which the tenant may have in the estate; and though the seller may affect to sell the complete and immediate interest in the estate, the buyer will

\* By a recent Act, 2 Vic., c. 11, purchasers and mortgagees are not to be bound by *lis pendens*, of which they have not express notice, unless the names &c. of the parties to be affected thereby, are registered, as the act prescribes.

take it subject to the interest of the tenant. And if a tenant under a lease has some further interest in the land by agreement posterior to the date of the lease, the buyer of the land, who has notice of the tenant's possession, has constructive notice of such agreement, and therefore he buys the estate subject to all the tenant's rights. It will of course be observed that the contract of a purchaser with a seller cannot affect the previous contract, about the same land, of another person with the same seller, so far as the mutual rights and liabilities of the seller and that other person are concerned. But the question between the two persons who have dealt with the seller is, Which of the two is to have that thing which he has agreed to buy, and which of the two is to have the trouble of settling the dispute with the seller. It is determined that the subsequent contractor, who has what is called notice of the former contract, must be considered as having the benefit of his own contract, but still subject to the prior contract; and if he has bought the estate and obtained a conveyance of it, having notice of a prior contract for sale, he will be compelled to convey the estate to the person who had such prior contract with the vendor. If the prior contractor has obtained any legal estate in the land, the buyer, of course, whether he has notice or not, only obtains from the vendor such interest as he can sell.

That which is notice to a man's agent is notice to himself, provided the agent has the notice in the transaction in which he acts as agent. This doctrine is obviously founded on the legal identity of the principal and agent, in all matters which the principal transacts by his agent.

It seems to be determined that the mere fact of a man being witness to the execution of a deed, will not be notice to him of the contents of the deed; for the nature of that transaction called witnessing a deed is not in any way connected with a knowledge of the contents of the deed.

Sometimes a person who is entitled to a sum of money or the interest of a sum of money which is in the hands of a trustee, will fraudulently sell his interest twice over. A second purchaser, who has no notice of the former transaction, and gives notice, that is, communicates in a way that cannot be misunderstood the fact of his purchase to the trustee before the former purchaser does, is entitled to have what he has bought, in preference to the other purchaser. By *not having* notice, he purchases a good title, and acquires a right to what he has bought, equal to the first purchaser's right; by *giving* notice, he secures that which he has purchased. This is a good example of Notice, viewed under two different aspects, which should not be confounded.

Other examples of notice may be found in the text books.

It will be collected from what has been said, that cases of this kind of notice under consideration, are cases in which three persons at least are generally concerned, a seller, a buyer, and some person who is interested in disputing the buyer's title to the thing which he has bought. The term is also applied, though less frequently, to the case of a seller and buyer only; for that which may be called notice in the other case may be equally well called notice in this. The seller may not intend to conceal or misrepresent any fact, and he may think that he has said everything that was necessary, and the buyer may think that he was buying the whole of an estate when the vendor was only selling the estate subject to certain encumbrances; and the state of facts may be such as would be evidence of notice to the purchaser as against a party who had contracted with the vendor previous to himself. The question then comes, whether such state of facts is to be considered as notice to the purchaser, in the case now supposed, as against the vendor, and equally binding on him as it would be in the case of a prior contracting purchaser. It may be observed that the doctrine of notice, as between a seller and a single buyer, has been applied to the case of a lease, where it was held that notice of a lease to a purchaser was notice of its contents; but this doctrine was derived from a case wherein three parties were concerned, a seller, a lessee, and a purchaser, and it does not appear to have been considered that the question of notice between two purchasers, or two parties claiming an interest in land against a third person, is not quite the same thing as the case of a dispute between two persons only, a seller and a buyer. (*Hall v. Smith*, 14 Ve., 426, 437.) This kind of question however, in English law, would be more properly considered under the heads of Concealment, Suppression, or Misrepresentation, which are a species of fraud; or under the head of Mistake.

The question of notice is one of great practical importance. So far as relates to what shall be evidence of notice, it will vary greatly in different systems of jurisprudence; so far as concerns its true nature, it belongs to the general doctrine of contracts.

Notice, in English law, as relates to buying and selling of land, is treated by Sugden, in his 'Vendors and Purchasers,' but in a very unsatisfactory way, so far as concerns the general principles of notice. Notice in other cases, as in Bills of Exchange, Distress, &c., is mentioned under those heads.

**NOTION, NOTIONAL.** The word notional has been used by Dr. Becker, in his 'German Grammar,' in a sense which it may be useful to explain. He divides all the words of which language consists into notional words and signs of relation. By notional words he understands those which express notions, that is, things which are the objects of the understanding, such as are expressed by the words usually called verbs, nouns, and adjectives. By signs of relation he understands such as merely express a relation between the different things, the objects of the understanding, which are expressed by notional words. The signs of relation are either mere terminations, that is, final letters which modify the form of the notional word, or they are separate words which he calls relational words. In the phrases, 'the dog barks,' 'my father's falling house,' the *s*, 's. and *ing*, are respectively terminations which indicate a relation between the things expressed in the several phrases. In the phrase, 'he lives in a town,' 'he left us after dinner,' *in* and *after* are relational words, that is, they connect the notions expressed by 'his living,' and 'his leaving,' respectively with the notions of 'town' and 'dinner.' Thus we may consider Notional words as the matter of language, and Relational words as giving to language its form, that is, what is commonly called its grammatical structure. It must be observed however that in many languages which possess few terminations, a considerable part of the relations which subsist among words, that is, among the notions which words express, are indicated by the order of the notional words as well as by signs of relation. This is true to some extent in all languages, but it is more particularly the case in such languages as our own.

This grammatical division of words adopted by Dr. Becker leads to the division of grammar into two main parts, etymology and syntax, the former of which respects the forms of the several words, and the latter their relations when combined in a sentence.

A notional word may either be a root or element incapable of further analysis, or it may be a form derived from such a root, as *grow*, *growth*, *long*, *length*, where the *th* is not a termination, in the sense of a sign of relation, but is a termination which modifies the notion of the word from which it is formed. A notional word may also be what Dr. Becker calls a Secondary Form, as *greatness*, *wealthy*, &c., the latter of which words exhibits the following process of development: *weal* (German, *wohl*), *wealth*, *wealthy*.

It is not intended by this division of words to affirm that some of such terminations as *ness*, &c. may not have been originally notional words. It is probable that all such terminations, and perhaps all terminations, have once been notional words, and that in the progress of usage they have become permanently attached to particular words, of which they may now for all purposes, except historical purposes, be considered a part, that is, a part necessary to give the word that meaning which it now has. Nor is it intended to affirm that words which are now merely words of relation, were not originally notional words: on the contrary, Dr. Becker admits that most of the relational words 'are derived from radical verbs, and therefore were originally notional words; they have now come to imply merely relations of notions, and do not differ in their present signification from the terminations of inflection. The use of Relational words increases in language in the same proportion as the power of inflection diminishes.'

This division of words into Notional and Relational appears to be of considerable importance. Some question however may arise whether all the words which Dr. Becker calls relational are properly placed by him in that class. Thus he considers the pronoun *I* as a word of relation merely, and implying *personality*. But this does not appear to us to be a correct view of the nature of that word. Interjections, he also observes, 'imply neither notions nor relations of notions, and are not necessarily connected with



the sentence; but the latter part of this proposition may be assented to without giving our assent to the former part.

NOTRE DAME. [PARIS.]

NOTTINGHAM, EARL OF. HENEAGE FINCH, whose father was recorder of the city of London, and a member of the family of the earls of Winchelsea, was born in 1621. He was educated at Westminster school, and was afterwards removed to Christ Church, Oxford. After leaving the university he became a member of the Society of the Inner Temple, London. On the restoration of Charles II. he was appointed solicitor-general, and distinguished himself in the prosecution of the regicides. He published 'An exact and most impartial Account of the Indictment, Arraignment, Trial, and Judgment of (according to law) Twenty-nine Regicides,' 4to., 1660; 8vo., 1679. In 1661 he was made member of parliament for the university of Oxford, and about the same time was created a baronet. In 1665 the diploma of LL.D. was presented to him by the university of Oxford. He took a prominent part in the impeachment of the earl of Clarendon in 1667; and in 1670 was appointed attorney-general. He succeeded the earl of Shaftesbury as lord-keeper of the great seal in 1673, and in 1675 was made lord-chancellor of England. He presided as lord high steward on the trial of Viscount Stafford, in 1680, and pronounced judgment against that nobleman in a speech of extraordinary eloquence. He was created earl of Nottingham in 1681, and died in 1682.

Besides the account of the trial of the Regicides, he published 'Speeches in both Houses of Parliament,' 1679: 'Speech at the Sentence of William Viscount Stafford,' 1680: 'Arguments upon the Decree in the Cause between the Hon. Charles Howard, Esq., Plaintiff; Henry, late duke of Norfolk; Henry, lord Mowbray, his son; Henry, marquis of Dorchester; and Richard Marriot, Esq., Defendants; wherein the several ways and methods of limiting a trust of a term for years, are fully debated,' Lond., 1685, fol.: 'An argument of the Claim of the Crown to Pardon on Impeachment,' fol.; and 8vo., 1791: there is a volume of 'Reports of Cases decreed in the High Court of Chancery during the time Sir Heneage Finch, afterwards earl of Nottingham, was Lord Chancellor,' 1725. Some valuable Chancery Reports, written with his own hand, were left by him. Lord Nottingham had a high reputation for sound judgment and integrity. It has been said of him, 'That he was a man of probity and well versed in the laws, an incorrupt judge, and in his own court could resist the strongest application even from the king himself.' 'He was,' says the anonymous author of the 'Lives of the Lord Chancellors,' 'a very eloquent person, and a most excellent orator, and a lord of that wisdom, that some have stiled him the English Roscius, the English Cicero, &c.' His character is drawn by Dryden, in his 'Absalom and Achitophel,' under the name of Amri—

'To whom the double Blessing does belong,  
With Moses' inspiration, Aaron's tongue.'

NOTTINGHAM. [NOTTINGHAMSHIRE.]

NOTTINGHAMSHIRE, an inland county of England.

It is bounded on the north-east and east by Lincolnshire, from which it is in one part separated by the river Trent; on the south-east and south by Leicestershire, from which it is separated in one part by the Soar; on the west by Derbyshire, from which it is separated in one part by the Erewash; and on the north-west by Yorkshire. Its form approximates to an oval. Its greatest length is from north by east to south by west, from the junction of the three counties of York, Lincoln, and Nottingham, to the village of Stanford on the Soar, 51 miles; its greatest breadth, from the border of Derbyshire between Mansfield and Alfreton, to the river Witham on the Lincolnshire border, not far from Newark, 26 miles. Its area is estimated at 837 square miles. The population in 1821 was 186,873; in 1831, 225,327; showing an increase in ten years of 38,454, or 20 per cent.; and giving 269 inhabitants to a square mile. In size it is the twenty-seventh of English counties; in amount of population, the twenty-second; and in density of population, the tenth. Nottingham, the capital, is near the Trent, 109 miles in a direct line north-north-west of London, or 124 miles by the mail-road through Woburn, Newport Pagnell, Harborough, Leicester, and Loughborough.

*Surface; Geological Character; Hydrography; and Communications.*—The surface of the county is undulating, except in the vale of Trent and the vale of Belvoir; but

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there are no very high hills. The northern boundary runs through the marshes that surround the Isle of Axholme. The east side of the county between the Witham and the Trent is for the most part flat. Beacon hill rises to the east of Newark: and a ridge of upland skirts the immediate valley of the Trent from the neighbourhood of Newark to Nottingham. The eastern side of this ridge has a very gradual slope toward the vale of Belvoir, watered by the Deven and its tributary the Smite. Quite in the south part of the county, between the Trent and the vale of Belvoir, are the Wold Hills, in which are included the Hotchley or Leak hills. On the west side of the Trent the ground rises gradually towards the Idle in the north-west and the Erewash in the south-west. The western escarpment which skirts the valley of the Idle is steeper: and it may be observed of the hills generally in this county, that their western slope is steeper than the eastern. Pear-tree hill and Gringley hill (235 feet) are at the northern end of these uplands, just above the Idle, and Langton Harbour and Holland Hill (467 feet high) are between the Trent and the Erewash. West of the Idle the ground rises again, but it is intersected by the valleys through which the tributaries of the Idle flow. Near the head of the Maun, one of these tributaries, are the high lands of Shirewood or Sherwood Forest, known in tradition as the principal haunt of Robin Hood. Sutton-in-Ashfield hill, west of Mansfield, is about 600 feet high.

The strata which occupy the surface of this county succeed each other in order from east to west. The eastern and south-eastern border of the county is chiefly occupied by the lias, which is found in that part of the vale of Belvoir which lies east of the Deven and the Smite, and, passing to the west of the latter river near its source, forms the Wold hills of Nottinghamshire and Leicestershire. The vale of Trent and the uplands to the west of it are for the most part composed of rocks of the red-marl or new red-sandstone group. In the northern part of the county these formations extend to the borders of Yorkshire and Derbyshire. Just along the northern border they sink beneath the fens surrounding the Isle of Axholme, in which isle they emerge again. Langton Harbour and Holland Hill belong to this formation. The striking colour of the red-marl has given origin to many local names, as Retford on the Idle, Radford, Radcliffe, and Ratcliffe, and perhaps Rudington, all in the neighbourhood of the Trent, and not far from Nottingham. Among the beds of this formation is a sandstone so soft as to admit of being easily excavated. The caverns near Nottingham are supposed to have given to that town (and through it to the county) its name, Snodengham, 'the home of caverns.' There are under that town many caves, some of them cellars of comparatively modern date, but others of considerable though unascertained antiquity. There are some caverns in the face of a cliff near the river Lene, west of Nottingham castle; and there are some remarkable excavations at Sneinton close to Nottingham. These are all probably artificial, or, if originating in natural caverns, have been enlarged and modified by human labour. Gypsum occurs plentifully in this formation, and is quarried in several places. The newer magnesian or conglomerate limestone underlies the red-marl; but in some parts these formations are separated by beds of quartzose gravel, extending to the depth of 600 or 900 feet, and often consolidated into a soft pudding-stone, of which the Castle hill at Nottingham is a specimen. 'Although this gravel has been referred by some to a recent alluvial origin, it seems more probable that it is a form of the conglomerate rocks so generally attendant upon this formation. It constitutes the prevailing stratum throughout Sherwood Forest.' (Conybeare and Phillips's *Outlines of the Geology of England and Wales*.)

The beds of the magnesian limestone occupy a tract varying from 4 to 7 miles wide in the south-western part of the county, west of a line drawn from Mansfield to Nottingham. Near Mansfield the strata are arched and contorted. West of the magnesian limestone occurs the great coal-field of South Yorkshire, Derbyshire, and Nottinghamshire, of which coal-field only a small part is comprehended in this county. Between Mansfield and Nottingham the limestone immediately overlies the coal, but south-west of Nottingham the coal-measures crop out from beneath the red-marl which occupies the valley of the Trent. There are many coal-pits in the county which yield abundance of coal. The general direction of the dip of the coal-beds is

The seams of coal vary from one or two to five or six feet.

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in thickness. The quality of the coal is similar to that of Newcastle, but rather inferior.

Blue limestone, approaching to marble in texture, is quarried in the lias of Beacon hill near Newark. Good bluish stone for building is dug at Maplebeck, between Mansfield and Newark; and there are quarries of gypsum and of a reddish stone sufficiently hard for building, or suited for burning into lime, at Gotham; both in the red-marl district. There are extensive quarries of reddish stone, from which immense blocks are raised, near Mansfield, near the boundary of the red-marl and the magnesian limestone. A quarry of the limestone at Mansfield Woodhouse is worked for lime: its beauty of colour and closeness of grain would render it more valuable than Portland stone, were it not for its extreme hardness. Coarse paving-stone, much used at Nottingham, is quarried at Linby, north of that town, in the magnesian limestone district.

**Hydrography, Communications, &c.**—The whole county belongs to the basin of the Trent, which river first touches the south-west border of the county at the junction of the Soar, flows along the border about 3 miles to the junction of the Erewash, and then entering the county flows through it 25 miles in a north-east direction to the neighbourhood of Newark: below Newark it turns to the north, and flowing first within and then upon the border of the county 25 miles farther, to below Gainsborough (Lincolnshire), finally quits the county and flows through the marshes of the Isle of Axholme to the Humber. That part of its course which appertains to this county is about 53 miles. It is a broad river, bordered by a belt of low lands, and navigable throughout for river craft, and up to Gainsborough for sea-borne vessels of 200 tons. There was not till lately any bridge over the Trent between Newark and Gainsborough, which towns are 21 miles distant. Recently a cast-iron bridge, of four arches, each 118 feet span, has been thrown over the river at Dunham. The total length of the bridge is 536 feet.

The Idle is formed by the junction of several streams. The Rainworth Water rises in Sherwood Forest 3 miles south of Mansfield, and flows north-east 12 miles to the town of Ollerton. Here it is joined on the left bank by the Maun, which rises at the village of Hardwick, and flows north-east 12 miles by Mansfield and through Clipstone park. From Ollerton the united stream, bearing the name of Maun, flows 4 miles north by east till it is joined on the left bank by the Meden, which rises at Whiteborough on the border of the county, 2 or 3 miles west of Mansfield, and flows 16 miles north-east by Church Wartop, and through Thoresby park. The river now takes the name of Idle, and flows north-east 4 miles to the neighbourhood of West Drayton, where it receives on the left bank the Wollen or Wallin, 17 miles long. This river rises in Derbyshire, and flows through the park of Welbeck abbey, where it expands into a large sheet of water, and then, after its junction with the Poulter (7 miles long), which also rises in Derbyshire, flows through Clumber park, where it again expands. From the junction of the Wallin, the Idle flows northward in a winding course of 18 miles to Bawtry, receiving on the left bank, just above that town, the Rayton or Ryton, 24 miles long, which rises in Yorkshire, and flows by Worksop and Blyth. After receiving the Ryton, the Idle flows eastward 2 miles to the border of Lincolnshire, and 7 miles more along the border, or just within it, into the Trent at West Stockwith. Below Bawtry its course is through the marshes of 'the Car,' south of the Island of Axholme. In this part it is called the Bicar Dyke, Bykersdyke, or Vicardyke, while the name of the New Idle is given to a straight navigable cut which runs north through the marshes of Thorne level into the lower part of the Trent. [AXHOLME. ISLE OF; LINCOLNSHIRE.] The whole course of the Idle, measured from the head of the Rainworth Water, the Maun, or the Meden, into the Trent at West Stockwith, is about 47 miles. It is navigable from East Retford, 12 miles above Bawtry. None of its tributaries are navigable.

The Soar has about 8 miles of its course, navigable throughout, on the border of this county and Leicestershire, to which latter it belongs. [LEICESTERSHIRE.] The Erewash rises in the county, very near the head of the Maun, and flows south-west to the border, and south-south-east along the border of this county and Derbyshire to its junction with the Trent. The Lene rises near the grounds of Newstead Abbey, 5 miles south of Mansfield, and flows 12 miles southward into the Trent near Nottingham; it flows through Newstead park, and close to the town of

Nottingham. The Dover Beck rises in Sherwood Forest, and flows 10 miles south-east into the Trent. The Deven rises in Leicestershire and flows northward into the Trent through the vale of Belvoir. Of its whole course of more than 20 miles, 8 or 9 belong to this county. Its tributary the Smite, 18 miles long, and the Whipling, 10 miles long, which flows into the Smite, belong chiefly to this county. The tongue of land at the junction of the Deven and the Trent is insulated by a navigable channel communicating between these two rivers. [NEWARK.]

Those parts of the Erewash and Cromford canals which are on the east side of the Erewash belong to Nottinghamshire. [DERBYSHIRE.]

The Nottingham Canal commences in the Cromford Canal at Langley Bridge, and runs in an irregular line south-east into the river Trent at Trent Bridge near Nottingham. It has a cut from above Nottingham into the river Trent at Beeston, higher up. The Act for this canal was obtained in 1792, and the canal completed in 1802.

The Grantham Canal commences at the town of Grantham in Lincolnshire, and pursues a very circuitous course for more than 30 miles to the Trent bridge near Nottingham, close to the place where the Nottingham Canal enters the Trent. It is partly in Lincolnshire, partly in Leicestershire, and partly in Nottinghamshire. The Acts for it were obtained in 1793 and 1797: the navigation is now complete between Grantham and Nottingham; but a short cut from the main line to Bingham is still unfinished.

The Chesterfield Canal commences in the Trent near West Stockwith, and runs south-west round the base of Gringley Beacon to East Retford; and from thence westward by Worksop, and thence again south-west through Yorkshire and Derbyshire to Chesterfield. In the Yorkshire part is a tunnel more than 1½ miles long; and near Gringley Beacon is another tunnel 153 yards long. This canal was commenced under an Act obtained in 1771, and was finished in 1776 or 1777. From the Trent to Retford it will receive boats of 50 or 60 tons burthen; in other parts, only of 20 tons. From the Trent to Worksop is a rise of 250 feet, and to the summit-level is a total rise of 335 feet.

The principal coach-roads are as follows:—the Carlisle and Wetherby mail-road enters the county 10 miles beyond Grantham in Lincolnshire, and 120 miles from Hicks's Hall, London; it passes through Newark (124 miles), Ollerton (137 miles), and Worksop (146 miles), into Yorkshire. The Edinburgh and York mail-road branches off from the last at Newark, and runs through Tuxford (137½ miles), East Retford (145 miles), and Bawtry (153 miles), which last is just within the border of Yorkshire. The Halifax mail-road enters the county at Rempston, 4½ miles beyond Loughborough in Leicestershire, and 112½ from London, and passes through Nottingham (124 miles), and Mansfield (138 miles) into Derbyshire. The Leeds mail-road enters the county at Upper Broughton, 6½ miles beyond Melton Mowbray in Leicestershire, and runs to Nottingham, where it falls in with the Halifax road.

The Mansfield and Pinxton railway runs from the town of Mansfield to the Cromford Canal at Pinxton mills, near Alfreton in Derbyshire, with a branch to the Codnor Park iron-works. This railway is above 8 miles long; at its commencement at Mansfield it is 101 feet 8 inches above the level of the Cromford Canal at Pinxton: its terminus at Pinxton is 8 feet above the canal. The Act for this railway was obtained A.D. 1817. It is chiefly used for conveying coal and lime. Branches of the Midland Counties Railway connect the London and Birmingham railway at Rugby with the towns of Leicester, Derby, and Nottingham; and the last two with each other. These branches follow the valleys of the Soar, the Derwent, and the Trent. A railway has been projected from Nottingham to Lincoln, there to join the proposed Great Northern Railway.

**Agriculture.**—The climate of this county is dry and healthy, and upon some of the light lands the harvest is as early as in many counties more to the south. The face of the country is undulating without rising to any great height. The high hills of Derbyshire intercept the westerly winds, and cause the clouds to discharge their moisture before they reach Nottinghamshire: the heaviest rains are when the wind comes from the east.

The county may be divided into three districts with respect to soil. In the first, sand and gravel prevail. This extends along the vale of Trent to the borders of Lincolnshire, and to the north of Nottingham along the ancient forest-land and border, in a strip of land about 30 miles

long and from 7 to 10 miles broad. The next is the clay, which lies between the Trent land and the last-mentioned strip, and in a part of the southern extremity of the county towards Leicestershire. The third district is that where limestone and coal are found. This lies partly on the borders of Derbyshire, and partly on the south-east, towards Leicestershire and Lincolnshire. Gypsum of an excellent quality is found on Beacon Hill, near Newark, and at Red Hill, at the junction of the Trent and Soar.

This county, of which a great portion was once forest-land, contains many fine parks and seats. In consequence of this many domains are held in hand by wealthy proprietors, and the buildings attached to these estates are substantial and convenient. An improved state of agriculture also results from this circumstance, and crops may be seen which, to a superficial observer, might appear to proceed from a much richer soil than it is in reality. There are, no doubt, many fertile spots; but the generality of the lands are not above mediocrity, and some are very poor. The farms are of moderate size, and the tenants are mostly at will, trusting to the honour of their landlords not to remove them without sufficient cause, nor to raise the rents beyond a fair rate. The same families have continued in some farms for generations.

The old plough of the county is a swing-plough, but wheel-ploughs have been introduced, and are very generally used. The other agricultural implements are such as are used in the adjoining counties; and the increased means of communication have brought every improved instrument, such as cultivators, scarifiers, and drills, into partial use. The gentlemen's bailiffs, as everywhere else, are ready to try new inventions. The old farmers are cautious, and wait till they are satisfied of their utility, which they are often slow in acknowledging.

Before the enclosure of the forest-lands and the commutation of the forestal rights, a great portion of the land could not be cultivated to advantage or improved. The practice of leaving the land in grass for several years, and then breaking it up for a course of cropping, prevailed in most parts of the county, and being better regulated, has introduced a modified convertible system, to which the lighter soils are well adapted. Turnips are cultivated to a great extent. Along the river Trent are some very good meadows and pastures, in which bullocks are grazed to advantage. The breeds which are preferred are the Hereford and the short-horn for the best pastures, and the small Scots for inferior. There are not many dairies, although some good cheese is made here and there. The dairies are chiefly along the Soar. The sheep are mostly of the Leicester breed. Some South-downs are however met with on many farms.

Before the common fields were enclosed and divided, the system of cultivation on the clay soil was very imperfect. A fallow, often not half cleaned, and but slightly manured, was followed by a crop of wheat, which was thought abundant if it reached three-quarters per acre, and moderately good, at little more than two. Beans and peas mixed together often followed; and, in spite of sowing thick, which produced straw and little corn, the weeds were not kept down: and the crop of oats which followed was generally half smothered with weeds, which the next fallow could not eradicate. Now a better system has succeeded; and although the fallow is thought absolutely indispensable, yet the tillage is better, the crops cleaner, and the produce more abundant.

There are many hop plantations in the county, which, in some years, give a good profit to the grower. There are excellent market-gardens in the neighbourhood of Newark, Nottingham, and other towns, the sandy soil being very favourable to the cultivation of roots and vegetables. There are some good orchards on the heavier soils, but no cider is made in the county.

The remains of the old forest-trees are still to be met with in parks, where they have been preserved as ornaments; but they have been greatly thinned in the woods which still remain. A better system of forest management has been introduced of late years, and more attention is paid to the growth of navy timber. Many new woods and plantations have been made in those parts of the forests which have been granted to individuals, or allotted on enclosures. Very extensive woods have been planted on the estates of the dukes of Newcastle and Portland.

The principal fairs in Nottinghamshire are as follows:—Nottingham, March 7, April 2, October 3; Newark,

Friday before the Sunday-fortnight before Easter, May 14, Whit-Tuesday, August 2, November 1, Monday before December 11; Mansfield, April 5, July 10, second Thursday in October; Warsop, May 21, November 17; Edwinstow, October 24; Worksop, March 31, October 15; Tuxford, September 25, hops; Retford, April 2, October 2, hops.

*Divisions, Towns, &c.*—Nottinghamshire is divided into six wapentakes and one liberty, beside the county of the town of Nottingham. The relative situation, &c. of these divisions is as follows:—

Name of Division.	Situation.	Area.	Population in 1831.
Bassetlaw wapentake:—			
Hatfield division	N.W.	111,220	19,461
North Clay division	N.E.	35,230	10,295
South Clay division	E.	38,080	7,496
Bingham wapentake	S.E.	55,760	12,442
Broxtow do.	W.	81,470	65,299
Newark do.	E.	41,910	17,111
Rushcliffe do.	S.	41,570	10,920
Southwell and Scrooby liberty	various parts	46,200	11,051
Thurgarton wapentake	Central	71,750	20,572
Nottingham town and county of town		2,610	50,680
		525,900	225,327

Each of the wapentakes consists of a north and a south division, except Bassetlaw, which has three divisions, as given above. The liberty of Southwell consists of parishes scattered through the different hundreds.

The county contains the county and corporate town of Nottingham, the borough and market towns of Newark and East Retford, and the market-towns of Bingham, Mansfield, Clleton, Southwell, Tuxford, and Worksop. BINGHAM (pop. 1738), MANSFIELD (pop. 9426), NEWARK (pop. 9557), and RETFORD (EAST) (pop. 2491), are described elsewhere; of the others we subjoin an account.

Nottingham is locally situated in the southern division of Broxtow hundred, on the north bank of the river Lene, about a mile north of the Trent. The borough constituted a county of itself, and comprehended, before the new arrangement of the municipal boundaries, an area (as above) of 2610 acres, with a population of 50,680; the additions lately made, pursuant to the recommendation of the Municipal Boundary Commissioners, may be considered as having raised the area to more than 4000 acres, and the population (calculated on the census of 1831) to more than 60,000, which now probably amounts to 70,000.

The early history of this place is involved in great obscurity. The excavations from which it is said to have gained its name (in Saxon) *Snotenga-ham*, or *Snotinga-ham*, which some interpret 'the home of caverns', are supposed to have had a British origin; and Gale contended for placing here the Roman station *Causennæ* or *Causennis*, which however others place at Ancaster in Lincolnshire. Nottingham was included in the kingdom of Mercia: it was taken by the Danes, to whom it was confirmed by the treaty between Alfred and Guthrum (A.D. 878 or 880): it was one of their Mercian burghs which connected their Northumbrian and East Anglian dominions. It was taken and fortified by Edward the Elder, but the Danes afterwards regained and held it until they were conquered by Edmund I. (A.D. 942). William the Conqueror built a castle here, the government of which he conferred on his natural son William Peverel. In the troubles of Stephen's reign the town was taken and burnt by the partisans of the empress Maud; and it suffered a similar fate either in the later troubles of the same reign, or in the rebellion of prince Henry, son of Henry II., against his father. In the troubles of the reign of Richard I. the castle, which was of great strength, was the object of contest; in those of the reign of John it was held throughout by the king. The seizure of Roger Mortimer, the paramour of queen Isabella, in Nottingham castle (A.D. 1330), is an incident well known. In the civil war of Charles I., that king set up his standard at Nottingham (August, 1642), but the place came next year into the hands of the parliament, who garrisoned the castle, of which Colonel Hutchinson (whom the 'Memoirs' of his lady have made so well known) was governor. During the Protectorate the castle was dismantled; and after the Restoration the old building was replaced by the present one, which has nothing of a castle but the name. The only occurrences of any importance since have been the 'Lud'



disturbances in 1811-12, and the riot arising out of the political excitement of 1831, on which occasion the castle was burnt by the rioters.

The town is on a considerable slope on the north bank of the Lene, commanding an extensive view of the vale of Trent. It consists of a number of streets irregularly laid out but remarkably well paved. Those in the central and more antient parts of the town are narrow; but considerable improvements have been effected of late years; the streets of modern erection are broader, and there are several ranges of good buildings. The castle is on a rock at the south-west corner of the town, overlooking the Lene. The market-place is one of the largest and finest in the kingdom, surrounded with lofty buildings. The extension of the town has been checked by the right of common over the land to the north and south of it possessed by the freemen. This has led to the formation of groups of houses of considerable extent in the neighbouring parishes of Sneinton, Lenton, and Radford, which may be regarded as suburbs of Nottingham, and have been by the late alteration included in the municipal limits. These outlying portions have a population of more than 20,000. There are several bridges in the town over the arms of the Lene or over the Nottingham canal; and about a mile south of the town is 'Trent Bridge' of nineteen arches over the Trent, a very antient structure, and exhibiting, from frequent repairs, great architectural variety: connected with this bridge are a causeway over the meadows and an embankment to protect the lower part of the town in the time of floods. The Trent is here about 200 feet wide. The environs of Nottingham are very pleasant.

Among the principal buildings are 'the New Exchange' at the east end of the market-place, a brick building erected early in the last century, and repaired and beautified in 1814. The lower part is appropriated to shops, behind which are the shambles; the upper part contains a suite of noble rooms for the transaction of public business or for assemblies. The county-hall, rebuilt A.D. 1770, is a commodious and handsome building, with two convenient courts, and apartments for the judges, jury, &c. The town-hall is a spacious edifice, of which the town gaol forms the ground-floor. There are a small plain theatre; a grand stand on the race-course, which is to the north of the town, and is one of the finest in the kingdom; extensive cavalry barracks in the castle park; and a building erected as a riding-house for the yeomanry, and now used as a circus or for other public amusements.

The borough before its late enlargement comprehended the three parishes of St. Mary, St. Peter, and St. Nicholas. St. Mary's church is in the central part of the town. It is a large cross-church, with a fine tower at the intersection of the transepts, rising two stages above the roof of the church, crowned with a battlement and eight crocketed pinnacles. The western end of the church has been modernised, but in very bad taste; the rest is of perpendicular character, and presents several peculiar features: it has a very large proportion of window light, perhaps greater than any other church in England. The interior is good, and contains some fine monuments. St. Peter's church is near the market-place. It is a large church, originally of perpendicular character, but the greater part has been modernised. It has a plain western tower, surmounted by a lofty octangular crocketed spire. St. Nicholas's church is in Castlegate-street, near the castle: it is a plain brick building, with stone quoins and cornices, erected in the latter end of the seventeenth century, in place of one pulled down during the civil war of Charles I. St. James's church or chapel is on Standard hill, in the extra-parochial district of the park: it is a neat modern edifice of perpendicular character, with a low embattled tower. St. Paul's chapel, in St. Mary's parish, is a modern Grecian building with a Doric portico. The church at Lenton is very small; it was built after the dissolution of the religious houses, but some portions of a more antient building appear to have been employed in its erection. Radford and Sneinton churches are both small: the latter stands on the summit of an excavated rock, and commands an extensive view. A grant for a new church in Sneinton parish has been made by the commissioners for the erection of new churches. There are several dissenting places of worship in Nottingham, especially for Wesleyan Methodists, Independents, and Baptists. The Catholics, Jews, Quakers, Unitarians, and several other sects have each their place of worship; that of the Catholics is a handsome building of Grecian architecture. There are several charitable institu-

tions. Plumtree hospital for poor and aged widows is a neat brick building, coated with cement, rebuilt within a few years: beside the inmates, there are several out-pensioners. Collins's hospital is for twenty-four aged widows or widows, who have each a tenement of two or three rooms and a weekly allowance, beside coals: the hospital is a neat brick building. Lambley hospital for decayed burghesses or their widows is a neat building consisting of a centre and two wings, with a green in front. There are a number of other hospitals or almshouses. The general hospital on Standard Hill (built A.D. 1781), and the county lunatic asylum (in which other patients as well as paupers are received), are spacious and commodious buildings. Thurland Hall, an antient house of the Elizabethan period, is still occasionally used for public dinners; it was the temporary residence of James I.

The principal manufactures carried on at Nottingham are bobbin-net and lace, and cotton and silk hosiery: nearly 7000 adult males were employed in these branches of industry in and about the town in 1831. There are several mills for spinning cotton and woollen yarn, and for throwing silk, and much cotton yarn is obtained from the mills of Derbyshire. The machines for making bobbin-net and lace, which are very expensive, are let out at a weekly rent to the workmen by capitalists, who invest a considerable sum in this kind of property. Steam-power has however been introduced of late into this manufacture. There are several dye-houses; there are also white-lead works and an iron-foundry. Wire-drawing, pin-making, and the manufacture of brass fenders are carried on to some extent; malting and brewing are also carried on, and 'Nottingham ale' has a high reputation. There are several windmills on the common north of the town. There are coal-pits in Radford parish, which employ 100 adult males. The market-days are Wednesday and Saturday for corn, cattle, and general provisions; the Saturday market is one of the principal in the midland counties. There are several yearly fairs for cattle, cheese, and cloth: at one of these fairs, distinguished as 'goose fair,' a considerable number of geese are sold. The trade of the town is much promoted by its proximity to the Trent, which is navigable, and from the communication thus afforded with the various canals connected with that river. The Nottingham canal passes close to the town, and joins the Trent at Trent bridge, a mile distant.

The corporation under the Municipal Reform Act consists of fourteen aldermen and forty-two councillors. The borough in its present enlarged extent is divided into seven wards, St. Ann's, Byron, Sneinton, Exchange, Canal, Radford, and Sherwood wards. Being a county, it has two sheriffs: there are a recorder, town-clerk, and other officers. The county magistrates have concurrent jurisdiction in the borough with the mayor and aldermen. Before the enlargement of the boundary, there was a police force of 100 men appointed by the magistrates at quarter-sessions; and some watchmen were maintained by private subscription. Water is supplied by three companies in abundance and at a reasonable rate. The assizes and quarter-sessions for the county are held here; also quarter-sessions for the borough; and a Court of Record for the borough every fortnight, and a sheriff's court every month for the recovery of small debts. The borough returns two members to parliament; the sheriffs are the returning officers. Nottingham is a polling-place for the northern division of the county.

The livings of St. Nicholas and St. Peter are rectories, of the clear yearly value of 216*l.* (with a glebe-house) and 336*l.* respectively: that of St. Mary is a vicarage, of the clear yearly value of 699*l.*, with a glebe-house. The perpetual curacy of St. James, Standard Hill, is of the yearly value of 200*l.* Radford and Lenton are vicarages, of the clear yearly value of 293*l.* and 139*l.* respectively; and Sneinton, a perpetual curacy of 227*l.* (*Clerical Guide*, 1836.)

There were, in 1833, in the three parishes of Nottingham and those of Lenton, Radford, and Sneinton, five infant-schools, with 540 scholars; eight boarding-schools, with 254 children; ninety-five day-schools (in a few of which boarders also were taken), with 4477 children; and forty-four Sunday-schools, with about 7840 children. Among the day-schools in this return were included the free grammar-school, with a valuable endowment, and 53 scholars; the Blue-Coat School, with 60 boys and 20 girls; a national school, with 573 children; three Lancasterian schools, with 484 children; and four other schools, wholly or chiefly supported by charitable contributions.

There is a public library and news-room in the market-place: the library consists of about 8000 volumes, besides a valuable collection of old books, kept separate from the rest (Lewis, *Top. Dict.*, 1831), and a mineralogical cabinet: in the buildings of this institution are lecture, news, and billiard rooms, and a law library: a literary society meets in the lecture-room. There is a mechanics' institute, established in 1824, which has a considerable library.

Ollerton is in the parish of Edwinstow, in the Hatfield division of Bassetlaw hundred, 137 miles from London by Newark, and 18½ miles from Nottingham. The whole parish of Edwinstow has an area of 17,270 acres, with a population, in 1831, of 1992, nearly half agricultural: the chapelry of Ollerton had 658 inhabitants, more than a third agricultural. The town is on the banks of the Maun; it has a neat Gothic chapel of modern erection, a Methodist chapel, and some good inns. A considerable quantity of hops is grown round the town. The market, which is on Friday, is small: there are a hop-market every Tuesday in September, and a yearly cattle and sheep fair. The living of Edwinstow, united with the three chapelries of Ollerton, Palethorpe, and Carburton (all in the parish), is a vicarage, of the clear yearly value of 639*l.*, with a glebe-house. The village of Edwinstow, which is on the Maun, above Ollerton, is extremely rural. The church is a venerable Gothic building, with a lofty spire. There were in the chapelry, in 1833, three day-schools, with 95 children, and two Sunday-schools, with 142 children.

Southwell is in that part of the liberty of Southwell and Scrooby which lies between the north and south divisions of Thurgarton hundred, 132½ miles from London by Newark, or 137 by Nottingham, from which it is distant 13 miles. It is likely that there was a Roman station here, or perhaps a fortified outpost of the neighbouring station of Ad Pontem, which antiquaries generally fix on the Trent, not far off. The name 'Burgage,' given to one of the districts of the town, is probably derived from the late Latin term 'burgus' (πύργος), a tower, and the remains of a fosse on 'the Burgage Hill' probably indicate the site of the Roman fort. Several Roman bricks have been used in the antient ecclesiastical buildings. A church was established here by Paulinus, one of the early missionaries sent over to convert the Anglo-Saxons, which became collegiate, and was richly endowed by the liberality of prelates and nobles of a subsequent age. Charles I. was frequently at Southwell during the civil war, and here he surrendered himself to the Scotch commissioners. The town is on a pleasant eminence near the small river Greet, an excellent trout-stream. It is a tolerably large place, with well-paved streets and well-built houses, and comprises the burgage, or burridge, the high town or prebendage (which two divisions constitute Southwell proper), and the adjacent hamlets of East Thorpe, West Thorpe, and Normanton. The whole parish has an area of 4550 acres, with a population of 3384, less than a third agricultural.

The collegiate church at Southwell is a large and magnificent cruciform building, consisting of nave and aisles, choir, transepts, and eastern transepts, two western towers, and a central tower. The nave and transepts and the towers are Norman, of very bold character and well-executed details. The towers are richly ornamented; the central tower, which is very massive, is also Norman. The extreme length of the church is 306 feet, breadth of the nave and aisles 59 feet, breadth at the transepts 121 feet. The choir and eastern transepts are of early English character, and the chapter-house decorated English, of an early period. There are some windows, of later insertion, of perpendicular character, particularly a large western window. The arches which support the centre tower, and several of the Norman doors, are fine; and the north porch is a large and much-enriched specimen of Norman. The piers of the nave are round and short; the windows of the triforium are large, and the clerestory windows small, showing circles on the outside and arches with shafts within. The nave and transepts have a wooden flat ceiling; the aisles have a stone groined roof. The early English portions are among the finest specimens of that style in the kingdom, and are in good preservation. The chapter-house is a fine specimen of early decorated: it has no centre pillar. The organ-screen and some stalls in the church are of later decorated character, and are peculiarly beautiful. Within the last fifty years two spires which crowned the western towers have been removed, and pinnacles of an incongruous character sub-

stituted. This noble building is well situated, being surrounded by a fine open space sufficient to give every side full effect. (Rickman's *Gothic Architecture*; plates in Rastall's *Southwell*, and in Cayley and Ellis's edition of Dugdale's *Monasticon*.)

The chapter of Southwell collegiate church consists of sixteen prebendaries, who keep residence each in rotation for three months. There is a vicar-general and commissary; and there are six vicars choral, five of whom have residences assigned to them, and a sixth has a house as vicar of Southwell. The gross yearly income of the church is 2211*l.*, the net income 954*l.* The prebendaries have also separate revenues. The vicarage of Southwell is of the clear yearly value of 144*l.*, with a glebe-house.

The entrance into the 'minster-yard' is by antient gateways, of which the western has a semicircular arch. In the yard are the extensive ruins of a former palace of the archbishops of York, the patrons of the church, consisting chiefly of the chapel and great hall, which have been fitted up as a modern residence: they are covered with ivy. Annual meetings of the Nottinghamshire clergy are held at Southwell, which is the mother-church of the county.

There are meeting-houses at Southwell for Methodists and Baptists, assembly-rooms and theatre, and a house of correction for the county.

The civil government of Southwell, the soke or liberty of Cum Scrooby, comprehending twenty townships, is separated from the rest of the county. The justices of the peace are appointed by the archbishop of York, but act under a commission from the crown: they hold quarter-sessions at Southwell and Scrooby. The chapter of Southwell, by their vicar, exercise all episcopal functions, except confirmation and ordination, over the peculiar of Southwell, which comprehends twenty-eight parishes. The soke and the peculiar are not coextensive.

There is little trade at Southwell, but the lace and hosiery manufacture employs from 100 to 200 workmen. (*Pop. Returns*.) There are several resident gentry. The market is on Saturday, and there are two yearly fairs.

There were in the parish of Southwell, in 1833, three boarding-schools and nineteen day-schools, with 419 scholars; and three Sunday-schools, with 408 children. Of the day-schools, four were supported by endowment; and in two others a few scholars were paid for from the proceeds of a charity. One of the boarding-schools, 'the Collegiate Grammar-school,' was partially supported by endowment.

Tuxford is in the South Clay division of the wapentake of Bassetlaw, 137¼ miles from London by Newark, and about 30 from Nottingham. The parish has an area of 3000 acres; the population, in 1831, was 1113, about one-third agricultural. The town has a modern appearance, having been rebuilt after a great fire, A.D. 1702. The principal trade is derived from its situation on the great north road, or from the cultivation of hops, which are grown to a considerable extent in the neighbourhood. The church exhibits a mixture of various styles of architecture. There is a Methodist meeting-house. The market is on Monday, and there are two yearly fairs, one for cattle and other livestock, the other for hops. The living is a vicarage, of the clear yearly value of 260*l.*, with a glebe-house. There were, in 1833, an infant-school, with 84 children; an endowed free-school, with 40 boys; and four other day-schools, with 70 children; a national day and Sunday school, with 53 children in the week and 100 on Sundays; and two Sunday-schools, with 105 children.

Worksoy is in the Hatfield division of the wapentake of Bassetlaw, 146 miles from London by Newark, and 26 from Nottingham. The area of the parish is 18,220 acres; the population, in 1831, was 5566, nearly half agricultural. The town is delightfully situated in a valley near the northern extremity of Sherwood Forest, and the neighbourhood is adorned by the magnificent seats of several noblemen. The town is near the river Rayton; it consists of one long principal street, with another branching from it at right angles. The streets are in general well paved, and the houses are well built. There is a 'moot-hall,' an antient building, for the public business of the town. The church is part of that which formerly belonged to a priory of canons of St. Augustin, founded here in the time of Henry I. by William de Luvetot. Its yearly revenues, at the dissolution, were 302*l.* 6*s.* 10*d.* gross, or 239*l.* 15*s.* 5*d.* clear. The church is a large building, originally cruciform, and of Norman architecture; but in the exterior are considerable admir-

tures of later styles. The western door is a beautiful Norman composition: at the east end of the present church is the tower, formerly central while the whole of the church was standing. The principal gateway of the priory is yet standing; the room over it is used as a national school, and there are several other remains of the priory, some of which have been incorporated with or converted into small dwelling-houses. There are Independent, Wesleyan and Primitive Methodist, and Catholic chapels, the latter near the manor-house, which is a seat of the duke of Norfolk. The manufactures of the town are trifling, but a good deal of business is done in malting. The market is on Wednesday, and there are three cattle-fairs, beside a statute fair. The Chesterfield Canal passes near the town: it is carried over the Rayton by an aqueduct. The living is a vicarage, of the clear yearly value of 388*l.*, with a glebe-house. There were in the parish, in 1833, eight boarding or day schools, with 244 children; two national schools, one of them partly supported by endowment, with 250 children; and three Sunday-schools, with 369 children.

Besides the above market-towns, there are several villages whose manufacturing industry has raised them to considerable importance. Basford is in the northern division of Broxtow wapentake, 2 or 3 miles north-west of Nottingham, near the right or west bank of the Lene. The area of the parish is 2720 acres; the population, in 1831, was 6325, about one-tenth agricultural. The village lies in a bottom, amid scenery of the richest character. The church has a handsome spire. The chief manufactures are those of hosiery, lace, and lace machinery, in which about 750 adult males are employed. There are cotton-mills, dye-houses, and bleaching-grounds, and several corn-mills. The court of the Honour of Peverel sits here; it has jurisdiction over Nottinghamshire and Derbyshire, and some places in Leicestershire: it is held twice a year for the decision of causes under 50*l.* The high-steward or his deputy presides. There is a gaol here connected with this court. The living is a vicarage of the clear yearly value of 260*l.* There were, in 1833, an infant-school, with 101 scholars; twelve day-schools, with 295 children; and ten Sunday-schools, with 1237 children. There are meeting-houses for Wesleyan Methodists, General Baptists, and Scotch Baptists.

Sutton in Ashfield is in the northern division of Broxtow wapentake, 3½ miles south-west of Mansfield. The area of the parish (including the hamlet of Hucknall under Huthwaite and the extra-parochial district of Fulwood) is 6040 acres; the population, in 1831, was 5746, about one-sixth agricultural. The village is situated on an eminence, and consists of several streets. The church is north-west of the village; it is of middling size, dedicated to St. Mary. There are places of worship for General or Arminian and Particular or Calvinistic Baptists, Independents, and Methodists. Nearly 900 adult males are employed in manufactures, chiefly of hosiery, lace, and lace machinery. There is a pottery for garden-pots and other coarse red ware. The Mansfield and Pinxton Railway passes through the parish. A customary market for provisions is held weekly in this village. The living is a perpetual curacy, of the clear yearly value of 118*l.* There were, in 1833, an infant-school, with 120 children; a national school, with 125 boys; eleven other day-schools, with about 240 children; and six Sunday-schools, with 1002 children.

Greasley is in the south division of Broxtow wapentake, 7 miles north-west of Nottingham, on the road to Alfreton in Derbyshire. The parish has an area of 8010 acres; the population, in 1831, was 4583, about one-fifth agricultural. The church of Greasley is handsome and spacious, with a lofty embattled tower. Above 300 persons are employed in manufactures, chiefly in those of hosiery, lace, and lace machinery. The Nottingham Canal passes through the parish; there are several coal-wharfs on its line. The Mansfield and Pinxton Railway passes not far from this place. The living of Greasley is a vicarage, of the clear yearly value of 134*l.*, with a glebe-house. There were, in 1833, three schools, partially supported by endowments, with 96 children; one school of 30 girls, supported by private benevolence; fourteen other day-schools, with 393 children; one boarding-school, with 14 children; and ten Sunday-schools, with 885 children.

Arnold is in the northern division of Broxtow hundred, 3½ miles from Nottingham, on the road to Mansfield. The area of the parish is 4670 acres; the population, in 1831, was 4054, about one-fifth agricultural. The village is large,

extending nearly a mile in length. The houses are neat and comfortable. Between 400 and 500 adult males are engaged in manufacture, chiefly of hosiery and cotton goods. On Hollyhill, in the neighbourhood of Arnold, are the remains of a Roman camp. The living is a vicarage, of the clear yearly value of 310*l.*, with a glebe-house. There were, in 1833, an endowed school, with 48 boys; seven other day-schools, with 204 children; and seven Sunday-schools, with 808 children.

Bulwell is in the northern division of Broxtow wapentake: Attenborough, Stapleford, and Beeston are in the southern; Gedling is in the southern division of Thurgarton wapentake; Ruddington is in the northern division of Rushcliffe wapentake; and Radcliffe or Ratcliffe upon Trent is in the southern division of Bingham wapentake. These villages all lie within a circle of 5 or 6 miles round Nottingham, and have a population of from 1094 (Attenborough) to 2611 (Bulwell), chiefly engaged in the hosiery and lace manufacture, which employs about 300 adult males in Bulwell and Beeston, nearly as many in Gedling, and a smaller number in the other villages. Ratcliffe alone has few manufacturers in it: it gets its name from a bank or cliff of red clay in the neighbourhood. It has a wharf on the Trent for landing goods. Ruddington is in the honour of Tutbury, and within the jurisdiction of a court held at Tutbury every three weeks for the recovery of debts under forty shillings. It has an endowed free-school and an infant school. At Stapleford are a Druidical monument and a rude obelisk apparently of Saxon construction. Attenborough has some coal-pits. The Trent and the Erewash and the Nottingham Canal pass through or skirt the parish.

Warsop (population 1281), in the Hatfield division of Bassetlaw wapentake, and Kirkby-in-Ashfield (population 2032) and Mansfield Woodhouse (population 1859), in the north division of Broxtow wapentake, lie within a circle of 5 or 6 miles round Mansfield. The last two are manufacturing villages, and have upwards of 150 adult males engaged chiefly in the lace and hosiery manufacture. Kirkby in Ashfield has coal-pits and lime-pits, which employ 130 adult males, and for the produce of which the Mansfield and Pinxton Railway opens a channel. There is a parish school-house, built in 1836. Mansfield Woodhouse has a large ancient church, built of stone, with a lofty tower and spire. The village contains some good houses. There are lime-kilns and freestone quarries, which employ 25 adult males. Roman antiquities of considerable interest have been found here.

Selston (population 1580), in the north division of Broxtow wapentake, and Eastwood (population 1395), in the south division, are on the western border of the county. About 100 persons are engaged in the manufacture chiefly of hosiery and lace in each parish; and there are extensive coal-works, especially in Eastwood parish. The Mansfield and Pinxton Railway passes near Selston, and the Nottingham Canal near Eastwood.

At Calverton (population 1196), in the southern division of Thurgarton wapentake, between Nottingham and Southwell, nearly 300 men are engaged in the hosiery and lace manufacture; at Sutton Bonnington, in the southern division of Rushcliffe wapentake, nearly 100; and at Hucknall-Torkard (population 2200), in the northern division of Broxtow wapentake, between Nottingham and Mansfield, upwards of 300.

*Divisions for Ecclesiastical and Legal Purposes.*—This county is included in the diocese and ecclesiastical province of York. It forms an archdeaconry comprising the several rural deaneries of Bingham, Newark, Nottingham, and Retford: beside the peculiar of Southwell, noticed above. The commissioners on the Established Church propose to subtract the archdeaconry of Nottingham from the diocese of York, in order to add it to that of Lincoln. The number of churches and chapels in the county is given in Browne Willis's *Cathedrals* (A.D. 1742), as 210, viz. 176 under the jurisdiction of the archdeacon of Nottingham, and 34 exempt; of which 28 are in the peculiar of Southwell, and 6 under the chapter of York. In the *Beauties of England and Wales* (A.D. 1813), the number of those under the archdeacon's visitation is given as 182, and the number of those exempt at 36; making a total of 218. In Lewis's *Topographical Dictionary* (1831) the number of parishes is given as 205, viz. 75 rectories, 89 vicarages, and the remainder perpetual curacies. In the *Geography of Great Britain and Ireland*, in the *Library of Useful Knowledge*, the number of parishes is given at 246.

The county is in the midland circuit: the assizes are held at Nottingham, to which place the judges proceed from Lincoln. The quarter-sessions are held each quarter at Nottingham, Newark, and East Retford. The jurisdiction of the soke of Southwell and Scroby has been mentioned in our topographical notice of Southwell. Some parishes are in the honour of Tutbury and subject to the court held there for the recovery of small debts. The court of the honour of Peverel, which has jurisdiction in suits under 50*l.* over Nottinghamshire and Derbyshire, and some parts adjacent, has been mentioned in our topographical notice of Basford, where the court sits.

The county gaol is at Nottingham: some new buildings have been added to it within the last few years. The county house of correction is at Southwell. The number of committals to these two places of confinement in the years from October, 1834, to October, 1835, and from October, 1835, to October, 1836, were as follows:—1834-5, Nottingham, 60 felons, 24 debtors; Southwell, 808 felons and misdemeanants: 1835-6, Nottingham, 333 felons and misdemeanants, 64 debtors; Southwell, 550 felons and misdemeanants. The great increase in the number of felons committed to Nottingham in 1835-6, and the decrease of the number committed to Southwell, were owing to the arrangements made by the magistrates of the county.

The number of members returned to parliament from Nottinghamshire before the Reform Act was eight, viz. two knights of the shire, who were elected at Nottingham, two members each for the boroughs of Nottingham and Newark, and two members returned by the burgesses of East Retford, conjointly with the freeholders of the wapentake of Bassetlaw. The admission of the freeholders took place a short time before the Reform Act by an act of parliament passed in consequence of the corruption of the burgesses. By the Reform Act the county was divided, and each division returns two members. The northern division comprehends the wapentakes of Bassetlaw and Broxtow. The court of election is held at Mansfield; and the polling-stations are Nottingham, Mansfield, and East Retford. The southern division comprehends the wapentakes of Rushcliffe, Bingham, Newark, and Thurgarton; the court of election is held at Newark, and the polling-stations are Newark upon Trent, Bingham, and Southwell. The number and distribution of borough members remained unaltered by that act.

*History; Antiquities, &c.*—In the earliest period of British history the county seems to have been included in the territory of the Coritani. Of these, its original inhabitants, it retains however very few memorials. There are some vestiges of a camp or fortification on a hill at Barton near the Trent, 4 or 5 miles south-west of Nottingham; and a few tumuli or barrows in different parts of the county, which are supposed to have had a British origin. To these we may add the caves in the sandstone rock at and near Nottingham, already noticed.

In the division of the island by the Romans, the county was included in the province of Flavia Cæsariensis. The Roman stations Ad Pontem, Margidunum, and Verometum, were probably in the county, and Segelocum was probably only just out of it on the Lincolnshire side of the Trent, near Littleborough. Ad Pontem was probably on the Trent near Southwell. Horsley was disposed to fix it at Farndon, a short distance above Newark, and it is probable that he is about right. Margidunum was probably near East Bridgeford, on the south bank of the Trent between Nottingham and Newark. There are the undoubted remains of a Roman camp there, and several Roman antiquities have been dug up. The foundations of Roman buildings were observed there by Stukeley. Verometum is close to the south border of the county near the village of Willoughby. There are some remains of the rampart and ditch which surrounded the station; and some foundations, mosaic pavements, coins, and other antiquities have been dug up. Of the Roman roads which connected these stations there are several traces. The Foss Way may be traced from Verometum for several miles in the direction of Newark: in several parts it is a deep ditch.

Many Roman remains have been discovered near Newark, which has probably risen from the ruins of some of the neighbouring Roman posts; and coins have been found in various other parts. But the most remarkable discovery was of the foundations of a Roman villa at Mansfield Woodhouse, in A.D. 1786. The pavement and other antiquities

found are minutely described by Major Rooke, the discoverer, in the 8th volume of the 'Archæologia.'

In the Saxon period it is likely that Nottingham was possessed at first by the Northumbrian Angles. When Redwald attacked Ethelfrith of Bernicia, who had expelled Edwin from the throne of Deira, or Yorkshire, the decisive battle took place in Nottinghamshire on the banks of the Idle (A.D. 617). When the Mercians became independent of Northumbria (A.D. 626), this county appears to have been included in their dominion: it was divided between the northern and southern Mercians, who were separated from each other by the Trent.

When the Northmen, under the sons of Regnar Lodbrog, invaded England, they passed the winter (A.D. 867-868) at Nottingham, which they had taken. They were attacked in the ensuing spring by the combined force of Wessex, under the king, Ethelred I., and his brother Alfred, and Mercia under Burrhed, king of that country. Neither party being able to obtain a decisive advantage, they made a treaty by which the Northmen retired to York. A few years after they re-entered Mercia, which they conquered; and by their treaty with Alfred (A.D. 878 or 880) obtained possession of that part which was north-east of Watling Street, including Nottinghamshire. The Mercian territory thus acquired appears to have been divided between the Danish burghs, of which Nottingham was one. These burghs were compelled by Edmund I. (A.D. 942) to submit to Wessex, but they seem to have retained the constitution of their local government, probably till near the time of the Conquest. After the Conquest, the greater part of the county, together with the castle of Nottingham, was bestowed by William the Conqueror on his natural son, William Peverel. He, or one of his successors, supported Stephen in his usurpation. With his Nottinghamshire men he assisted in defeating the Scots in the battle of the Standard near Northallerton (A.D. 1138), and was taken prisoner with Stephen at the battle of Lincoln (A.D. 1141). His castle of Nottingham was taken, and the town burnt, by the partisans of the empress Maud. In the civil war carried on by the sons of Henry II. against their father, Nottingham was taken by surprise by Robert, earl of Ferrers, a partisan of the young princes. In the civil war of John's reign, the only event connected with the county was the death of that prince at Newark, October, 1216. In the early part of the reign of Edward III., Roger Mortimer was seized by the king in Nottingham Castle.

In the rebellion of Lambert Simnel (A.D. 1487) the forces of that pretender, consisting of 2000 German veterans under Martin Swart, an experienced officer, and about 6000 half armed Irishmen, were encountered by the royal army under Henry VII. in person, at East Stoke, on the right bank of the Trent, near Newark. The rebels were defeated; half of them were slain, including their leaders, the earl of Lincoln and Swart. Simnel was taken prisoner; and Lord Lovel, another leader, escaped from the fray, but was either drowned in his flight across the Trent, or was compelled to conceal himself for the rest of his days. (Carte, *Hist. England.*)

At the commencement of the civil war of Charles I. the king set up his standard at Nottingham with great ceremony (A.D. 1642). Shortly after this Nottingham came into the hands of the parliament, and continued so to the end of the war. Newark, which was held by a body of Royalists under the command of Sir John Henderson, was besieged (A.D. 1644) by a body of parliamentary forces under Sir John Meldrum and Lord Willoughby of Parham. Prince Rupert, advancing to relieve the place, surprised the besiegers by the rapidity of his march, drove part of their forces over the Trent, and compelled another portion to capitulate, with all their artillery and ammunition. In the winter of 1644-45 it was again besieged by the Parliamentarians, but without success, the garrison having been relieved by Sir Marmaduke Langdale, who was sent by Prince Rupert for that purpose. The troops at Newark, now under Sir Richard Byron, being thus relieved from siege, were of material service to the king's cause in this part, beating some parliamentary detachments and keeping their posts in a state of alarm. Among other services, a detachment from this garrison assisted at the storming of Leicester in 1645. Not long after his defeat at Naseby the king was at Welbeck, in the northern part of the county, and marched northward to Doncaster, with the view of joining Montrose in Scotland. Upon the arrival of a body

of Scots horse however at Rotherham, the king retired to Newark, whither Sir Marmaduke Langdale had retreated after the battle of Naseby (A.D. 1645). From Newark the king marched to Oxford, but was again at Newark in October of the same year; and it was there that he was deserted by his nephews Rupert and Maurice, and by several of his officers. In November, being pressed by the approach of the Scots under the earl of Leven, and by a body of Parliamentarians under Poyntz from the west, he withdrew to Oxford. Newark was forthwith besieged by the Scots; and in May, 1646, the king surrendered himself at Southwell to the Scotch commissioners, by whom he was conducted to the besiegers' quarters. The day after his arrival Newark was delivered up by his orders. In 1648 Cromwell was in Nottinghamshire with the troops destined to oppose the English Royalists under Sir Marmaduke Langdale and the Scots under the duke of Hamilton. Monk with his army marched through Nottinghamshire, passing through Mansfield, Southwell, and Nottingham in his way southward (A.D. 1660) to restore the king.

Of architectural antiquities Nottinghamshire is somewhat barren, and its ecclesiastical buildings are, with two or three exceptions, such as St. Mary's Church at Nottingham and Southwell Collegiate Church, already described, by no means remarkable for splendour. Balderton, Hovringham, and Mansfield churches have some Norman portions; Newark church has some slight remains of Norman: the churches of Bingham, Coddington, Hawton near Newark, and Upton St. Peter near Southwell, have considerable portions of early English: Hawton is especially worthy of examination. Of the monastic ruins the most beautiful is Newstead. Here was a priory of Black or Austin Canons, founded by Henry II. about A.D. 1170, whose yearly revenues at the dissolution were estimated at 219*l.* 18*s.* 8*d.* gross, or 167*l.* 16*s.* 11*d.* clear. The rest of the monastic buildings were fitted up as a residence by Sir John Byron, to whom they were granted, but the chapel was allowed to go to decay. Its front is an exceedingly beautiful specimen of early English, scarcely equalled by any other specimen in elegance of composition and delicacy of execution. Of Rufford Abbey, near Ollerton, there are some remains incorporated in a large mansion of later date, which retains the original designation. It was a Cistercian abbey, founded by Gilbert, earl of Lincoln, A.D. 1148: its yearly revenues at the dissolution were 254*l.* 6*s.* 8*d.* gross, or 176*l.* 11*s.* 6*d.* clear. Of Welbeck Abbey the only remains are some of the arches of the vaults and some walls of the superstructure, now incorporated in the mansion of the duke of Portland. The revenues of this abbey for Premonstratensian canons

(founded A.D. 1153) were at the dissolution 298*l.* 4*s.* 8*d.* gross, or 249*l.* 6*s.* 3*d.* clear. Part of the cloisters and some other portions of Mattersey Gilbertine Priory, near the Idle, yet remain. There are also some remains of Thurgarton Priory for Austin canons. There is an ancient castle at Newark; also a handsome cross.

(Thoroton's *Nottinghamshire*, by Throsby; *Beauties of England and Wales*; Conybeare and Phillips, *Outlines of the Geology of England and Wales*; Rickman's *Gothic Architecture*; Rastall, *History of Southwell*; Palgrave's *Rise and Progress of the English Commonwealth*; Turner's *Anglo-Saxons*; Lewis's *Top. Dictionary*; *Parliamentary Papers*.)

## STATISTICS.

**Population.**—Nottinghamshire is chiefly a manufacturing county, a large proportion of its population is also engaged in agriculture. In 1831 it ranked the 30th on the list of agricultural counties. Of 56,582 males twenty years of age and upwards, 14,260 were engaged (in 1831) in manufactures or in making manufacturing machinery, and 16,856 were occupied in agriculture; of this latter number 11,799 were labourers. Most of those employed in manufactures were engaged in the manufacture of stockings and lace; of these there were at Nottingham, 4740; at Radford, 1300; at Mansfield, 800; at Sutton-in-Ashfield, nearly 800; at Basford, 750; at Snenton, 430; at Hucknall-Torkard, at Beeston, at Linton, and at Carlton, upwards of 300 each; at Bulwell, Greasley, and Calverton, about 280 each; at Kirby-in-Ashfield, Mansfield-Woodhouse, Stapleford, Southwell, Lambley, Ruddington, and Selston, between 200 and 100 each. In most of the places here named the manufacture of stockings, lace, frame-work machinery, and the materials of the lace manufacture, are conjoined or intermingled so as not to be distinguishable in a general description. There were 50 weavers at Newark and 19 at Hawton; sacking is made at West Retford; candle-wicks at Gamston.

The population of Nottinghamshire, as given at each time the census was taken, was as under:—

	Males.	Females.	Total.	Increase per cent.
1801	68,558	71,792	140,350	..
1811	79,057	83,843	162,900	16·06
1821	91,491	95,382	186,873	14·70
1831	110,457	114,870	225,327	20·57

showing an increase, between the first and last periods, of 84,977, or not quite 38 per cent. on the whole population; being 19 per cent. below the whole increase in England and Wales.

The following table contains a summary of the population of every hundred, as taken in 1831:—

HUNDREDS or WAPENTAKES, BOROUGHs, &c.	HOUSES.				OCCUPATIONS.			PERSONS.			
	Inhabited.	Families.	Build- ing.	Unin- habited.	Families chiefly employed in agri- culture.	Families chiefly employed in trade, manufac- tures, and handicraft.	All other Families not com- prised in the two preced- ing classes.	Males.	Females.	Total of Persons.	Males twenty years of age.
Bassetlaw —											
Hatfield Division .	3,845	4,001	21	96	2,220	1,058	723	9,723	9,738	19,461	5,032
North-Clay Division .	2,189	2,254	6	105	968	708	578	4,995	5,300	10,295	2,529
South-Clay Division .	1,505	1,595	5	32	1,119	306	170	3,798	3,698	7,496	2,002
Bingham, North and South Divisions .	2,394	2,573	13	55	1,615	589	369	6,246	6,196	12,442	3,114
Broxtow, North and South Divisions .	12,662	13,068	191	495	1,990	8,463	2,915	32,534	32,765	65,299	16,125
Newark, North and South Divisions .	1,496	1,572	3	37	996	340	236	3,745	3,809	7,554	1,919
Rushcliffe, North and South Divisions .	2,118	2,236	5	53	1,211	713	312	5,519	5,401	10,920	2,731
Southwell and Scrooby (Liberty) .	2,216	2,271	19	59	1,247	679	345	5,477	5,574	11,051	2,794
Thurgarton, North and South Divisions (Hun- dred or Wapentake)	4,082	4,259	48	272	1,813	2,034	412	10,305	10,267	20,572	5,352
Newark-upon-Trent (Borough) .	2,022	2,087	9	62	63	1,019	1,005	4,499	5,058	9,557	2,337
Nottingham (Town and County of the Town) .	10,407	10,901	136	435	109	9,669	1,123	23,616	27,064	53,680	12,647
Totals .	44,936	47,117	456	1,701	13,351	25,578	8,188	110,457	114,870	225,327	56,582



**County Expenses, Crimes, &c.**—The sums expended for the relief of the poor at the four dates of

	£	s.	d.
1801 were	44,222	being	6 3 for each inhabitant.
1811 ..	88,013	"	10 9 "
1821 ..	73,315	"	7 10 "
1831 ..	72,717	"	6 5 "

The sum expended for the same purpose for the year ending March, 1838, was 55,003*l.*: and if it be assumed that the population had the same rate of increase between the years 1831 and 1838 as it had during the ten years preceding 1831, the above sum gives an average of *s.* 3*d.* for each inhabitant. These averages are below those for the whole of England and Wales.

The sum raised in Nottinghamshire for poor-rate, county-rate, and other local purposes, in the year ending 25th of March, 1833, was 116,380*l.*, and was levied upon the various descriptions of property as follows:—

On land	£75,634 14 <i>s.</i>
Dwelling-houses	34,494 0
Mills, factories, &c.	4,782 13
Manorial profits, navigations, &c.	1,469 8
<b>Total</b>	<b>116,380 15</b>

The amount expended was—

For the relief of the poor	£74,762 10
In suits of law, removal of paupers, &c.	3,705 11
For other purposes	39,446 1

**Total money expended 117,914 2**

In the returns made up in subsequent years the descriptions of property assessed are not specified. In the years 1834, 1835, and 1836, there were raised 101,235*l.* 12*s.*, 92,012*l.* 6*s.*, 84,791*l.* 10*s.*, and the expenditure of each year from 1834 to 1838 was as follows:—

	1834.	1835.	1836.	1837.	1838.
For the relief of the poor	66,030	55,182	50,366	46,562	55,003
In suits of law, removal of paupers, &c.	3,979	3,337	2,825	1,866	1,296
Payments towards the county-rate	30,522	21,191	20,276	not given.	19,546
For all other purposes		13,824	13,045	8,993	6,726
<b>Total money expended</b>	<b>£100,531</b>	<b>93,534</b>	<b>86,512</b>		<b>82,570</b>

The saving effected in the whole sum expended in 1838, as compared with that expended in 1834, was therefore 17,961*l.*, or more than 17 per cent.; and the sum expended for the relief of the poor in 1838 was less than that in 1834 by 10,027*l.*, or not quite 17 per cent.

The number of turnpike trusts in Nottinghamshire, as ascertained in 1836, under the acts 3 and 4 William IV., c. 80, were 22; the number of miles of road under their charge was 302. The annual income arising from tolls and parish composition in lieu of statute duty, in 1836, was 17,886*l.*, and the annual expenditure in the same year was as follows:—

Manual labour	£4,894 10
Team labour, and carriage of materials	653 13
Materials for surface repairs	2,203 6
Land purchased	87 12
Damages done in obtaining materials	105 1 <i>s.</i>
Tradesmen's bills	586 £
Salaries of treasurer, clerk, and surveyor	1,394 6
Law charges	172 1
Interest of debt	4,877 4
Improvements	1,147 17
Debts paid off	420 0
Incidental expenses	294 8
Estimated value of statute duty performed	1,236 4
<b>Total expenditure</b>	<b>18,073 4</b>

The county expenditure in 1834, exclusive of that for the relief of the poor, was 15,532*l.* 11*s.*, disbursed as follows:—

Bridges, building, repairs, &c.	£273 3
Gaols, houses of correction, &c., and maintaining prisoners	3,437 12
P. C., No. 1020.	

Shire halls, and courts of justice, building, repairing, &c.	£2,418 13
Lunatic asylums	627 16
Prosecutions	1,694 14
Clerk of the peace	1,268 18
Conveyance of prisoners before trial	653 16
Conveyance of convicts	217 17
Vagrants, apprehending and conveying	264 19
Constables, high and special	151 10
Coroner	264 5
Debt, payment of, principal and interest	1,685 0
Miscellaneous	2,274 9

**Total expenditure 15,232 11**

The number of persons charged with criminal offences in the three septennial periods ending with 1820, 1827, and 1834, were 1227, 1657, and 2255 respectively, making an average of 175 annually in the first period, of 237 in the second period, and of 322 in the third period. The number of persons tried at quarter-sessions in each of the years 1831, 1832, and 1833, in respect to which any costs were paid out of the county rates, were 103, 108, and 98 respectively. Among the persons charged with offences there were committed for—

	1831.	1832.	1833.
Felonies	95	104	93
Misdemeanors	8	4	5

The total number of committals in each of the same years was 123, 97, and 98 respectively.

	1831.	1832.	1833.
The number convicted was	101	93	87
Acquitted	18	8	22
Discharged by proclamation	7	5	4

There were 250 persons charged with crimes at the assizes and sessions in Nottinghamshire in 1838. Of these 9 were charged with offences against the person, only 1 of which was a common assault; 21 were charged with offences against property committed with violence; 216 with offences against property committed without violence; none were charged with malicious offences; and 4 were charged with various misdemeanors.

Of the whole number committed, 202 were convicted, 33 were acquitted, 2 were not prosecuted, and no bill was found against 13. Of those convicted, 1 was sentenced to death, and had his punishment commuted to one year's imprisonment; 54 were transported for various periods; 18 were imprisoned for one year; and 127 for six months or under; 1 was fined. Of the whole number of offenders, 217 were males and 33 females; 80 could neither read nor write; 145 could read and write imperfectly; 20 could read and write well; one had received superior instruction; and the degree of instruction of the remaining 4 could not be ascertained.

The number of persons registered to vote for county members in 1837 was 7010. Of these, 4419 were freeholders, 67 leaseholders, 477 copyholders, 1978 occupying tenants, 67 trustees, and 2 mortgagees: being 1 in 32 of the whole population, and 1 in 8 of the male population twenty years of age and upwards, as taken in 1831.

Nottinghamshire contains six savings' banks: the number of depositors and amount of deposits on the 20th of November, in each of the following years, were as under:—

	1832.	1833.	1834.	1835.
Number of depositors	8,078	8,597	9,150	9,733
Amount of deposits	£233,659	£236,260	£250,585	£271,076

The various sums in the savings' banks in 1836, 1837, and 1838, were distributed as under:—

	1836.		1837.		1838.	
	Depositors.	Deposits.	Depositors.	Deposits.	Depositors.	Deposits.
Not exceeding £20	5,973	£39,903	6,487	£39,784	7,099	£48,964
" 50	2,723	80,974	3,794	84,629	3,747	85,783
" 100	1,224	81,989	1,324	83,683	1,249	86,532
" 150	419	49,967	403	49,111	437	52,581
" 200	227	37,346	243	40,448	249	41,606
Above 200	39	8,277	35	7,734	32	6,911
	10,605	299,396	11,183	304,399	11,813	332,367

**Education.**—The following summary is taken from the Parliamentary Returns on Education made in the session of 1835.

	Schools.	Scholars.	Total.
Infant schools . . . . .	34		
Number of children at such schools; ages from 2 to 7 years:—			
Males . . . . .		578	
Females . . . . .		639	
Sex not specified . . . . .		355	
		—	1,572
Daily schools . . . . .	647		
Number of children at such schools; ages from 4 to 14 years:—			
Males . . . . .		9,670	
Females . . . . .		7,532	
Sex not specified . . . . .		2,665	
		—	19,867
Schools . . . . .	681		
Total of children under daily in- struction . . . . .			21,439
Sunday-schools . . . . .	366		
Number of children at such schools; ages from 4 to 15 years:—			
Males . . . . .		14,685	
Females . . . . .		13,953	
Sex not specified . . . . .		4,132	
		—	32,170

Assuming that the population between the ages of 2 and 15 years has increased in the same proportion as the whole of the population since 1821, and that the whole population has increased in the same ratio since 1831 as in the ten years preceding that time, the approximate number of children between the ages of 2 and 15 years thus found residing in Nottinghamshire in 1833 was about 78,113. Twenty-three Sunday-schools are returned from places where no other school exists, and the children, 1335 in number, who are instructed therein cannot be supposed to attend any other school; at all other places Sunday-school children have opportunity of resorting to other schools also, but in what number, or in what proportion duplicate entry of the same children is thus produced, must remain uncertain. Seventeen schools, containing 938 children, which are both daily and Sunday schools, are returned from various places, and duplicate entry is therefore known to have been thus far created. Making allowance for this cause therefore, we may perhaps fairly estimate that less than two-thirds of the children between the ages of 2 and 15 years are under instruction in this county.

#### Maintenance of Schools.

Description Schools.	By endowment.		By subscription.		By payments from scholars.		Subscrip. and pay- ment from scholars	
	Schls.	Scho- lars.	Schls.	Scho- lars.	Schls.	Scho- lars.	Schls.	Scho- lars.
Infant Schools	1	73	2	109	52	569	9	816
Daily Schools	86	2,225	36	2,166	502	13,637	24	1,839
Sunday Schools	4	171	352	31,505	7	41	8	463
Total . . . . .	91	2,474	389	33,780	526	14,247	41	3,108

The schools established by Dissenters, included in the above statement, are—

Daily-schools . . . . .	21, containing	Scholars.
Sunday-schools . . . . .	168 . . . . .	17,659

The schools established since 1818 are—  
Infant and other daily schools 301, containing 10,184  
Sunday-schools . . . . . 247 . . . . . 22,745

Twenty-eight boarding-schools are included in the number of daily-schools given above. No school in this county appears to be confined to the children of parents of the Established Church, or of any other religious denomination, such exclusion being disclaimed in almost every instance, especially in schools established by Dissenters, with whom are here included Wesleyan Methodists and Roman Catholics.

Lending-libraries of books are attached to 50 schools in this county.

NOUN (in Grammar), the name of one of the parts of speech into which grammarians have distributed the words of a language. The noun generally expresses the subject of discourse, or the name (*nomen*) of the thing spoken of, as *horse*, *table*, *darkness*, &c.; but it may also be used as the predicate, as in the sentence, 'Tin is a metal,' where both 'tin' and 'metal' are nouns.

So far as respects the form of nouns, that is, the sounds

of which they are composed, they are capable of classification in all languages. The nature of this classification may be explained from examples in our own language. Many nouns are simple roots, as *horse*, *ship*, *man*, *tree*; while others are formed by adding a suffix to the root or to other words. [NORION, NOTIONAL.]

The following list of nouns, formed by suffixes, belong to the Saxon part of our language. A few examples of each suffix are given in order to show the use of each suffix more clearly:—

Er.	Star.	Ard.	Eer.
build-er	game-ster	drunk-ard	mountain-ear
box-er	malt-ster	slugg-ard	chariot-eer
walk-er	song-ster	daunt-ard	musket-eer
scoff-er	pun-ster	blink-ard	engin-eer

Some of the words in *er*, *ster*, and other terminations have a corresponding feminine termination in *ess*, *ix*, or *stress*, as *murderess*, *songstress*, *executrix*. The termination *ix* is of Latin origin.

Ling.	Kin.	Let.
fat-ling	lamb-kin	river-let
first-ling	pump-kin	cut-let
dar-ling (dear-ling)	pip-kin	stream-let
fond-ling	manni-kin	is-let

These three terminations generally, but not always, give to the root the notion of smallness, and hence they belong to the class called diminutives.

Dom.	Hood.	Ness.
king-dom	boy-hood	bad-ness
wis-dom	child-hood	base-ness
prince-dom	false-hood	cold-ness
thrall-dom	man-hood	dark-ness

Rick—as bishop-ric; Wick—as bail-wick.

Ship.	Th (from adjectives, with a change in the vowel).	T (mostly past participles).
friend-ship	long-th	gift
hard-ship	bread-th	draft
partner-ship	dep-th	joint
court-ship	streng-th	thief-t

The following terminations are of Latin and Greek origin, though most of them seem to have come through the Norman portion of our language:—

Acy.*	Age.†	An or Jan.	Auce.	Ancy.‡
conspir-acy	append-age	peg-an	abund-ance	depend-ency
fall-acy	band-age	artis-an	repent-ance	expect-ency
suprem-acy	broker-age	guard-ian	resist-ance	occup-ency
lun-acy	cord age	tragedi-an	observ-ance	vac-ancy

Ary.	Ate.	Ence.	Ency.
api-ary	advoc-ate	consci-ence	ag-ency
lumin-ary	potent-ate	consequ-ence	clem-ency
emiss-ary	prim-ate	impot-ence	curr-ency
libr-ary	gradu-ate	infer-ence	tend-ency

Ent.	Ice.	Ics.	Ion.
correspond-ent	mal-ice	eth-ics	adopt-ion
presid-ent	just-ice	opt-ics	animat-ion
stud-ent	avar-ice	mechan-ics	anticipat-ion
ag-ent	coward-ice	phys-ics	corrupt-ion

Ism.	Ist.	Ment.	Ory.
athe-ism	bapt-ist	allure-ment	audit-ory
bapt-ism	de-ist	enjoy-ment	vict-ory
critic-ism	flor-ist	entice-ment	direct-ory
fanatic-ism	fatal-ist	frag-ment	deposit-ory

Or or Tor.	Tude.	Ty.	Ure.
correct-or	altit-ude	facili-ty	depart-ure
inspect-or	forti-ude	liber-ty	fig-ure
jur-or	grati-ude	plen-ty	literat-ure
edit-or	lati-ude	civili-ty	press-ure

The preceding list contains the majority of the terminations of nouns in the English language which are not simple roots. The number, case, and gender of nouns in general are explained in the articles NUMBER, DUAL NUMBER, GENDER, ABLATIVE and ACCUSATIVE CASES.

NOUREDDIN (Malek-al-Adel Noor-ed-deen Mah-mood), one of the most celebrated and powerful of the Moslem rulers of Syria in the age of the Crusades, born A.D. 1117, A.H. 511, was a younger son of Amad-eddin

\* Usually formed from adjectives in *ate*, as accur-ate, accur-acy.

† Apparently from the barbarous Latin *agrum*.

‡ Usually formed from adjectives in *ant*, as abund-ant, abund-ancy.

Zenghi, the second of the dynasty of the Atabeks of Irak an Syria. At the death of his father, who was murdered by his own Mamlukes at the siege of Jabbar, A.D. 1146, A.H. 541,\* Noor-ed-deen, hastening to Aleppo with the signet of the deceased prince, secured the possession of that city and of his father's Syrian dominions; while Mesopotamia, with Moossol for a capital, fell to the lot of the elder brother Seif-ed-deen; and the feeble attempts of Alp-Arslan, a prince of the house of Seljuk, to assert his ancestral claims to the dominion of these provinces, were easily frustrated by the combined power of the two brothers. The earliest exploits of the reign of Noor-ed-deen were in continuance of the *Holy War* which his father had assiduously waged against the Latin Christians of Palestine: Josceline de Courtenay, whose capital of Edessa had been taken by Zenghi a few years previous, was signally repulsed in an attempt to recover it, and the Christian inhabitants, who had aided the enterprise, were put to the sword without mercy by command of Noor-ed-deen, who even levelled the fortifications of the town to prevent its ever again becoming a bulwark to the kingdom of Jerusalem. The recovery of this important fortress was the avowed object of the second crusade, undertaken A.D. 1148, under Louis VII. of France and the emperor Conrad: but of the mighty hosts which they led from Europe, only a miserable and dispirited remnant escaped the arrows of the Seljuk Turks in their march through Anatolia to Palestine; the project of retaking Edessa was abandoned as hopeless; the siege of Damascus, which was attacked by the crusading monarchs in conjunction with Baldwin III. of Jerusalem [BALDWIN III.], was foiled when on the eve of success by the address with which the minister of the Moslem prince Modjir-ed-deen fomented the mutual jealousies of the Christian leaders; and this vast armament, which if properly directed might have overwhelmed the rising power of Noor-ed-deen, only served by its failure to extend and confirm it. Resuming the offensive immediately after the departure of the crusaders, he invaded the territory of Antioch, and in a pitched battle (June 27, 1149) routed and slew the prince Raymond, whose head was sent as a trophy to the caliph at Bagdad; and though he sustained a severe defeat in the following year from his ancient opponent Josceline de Courtenay, who surprised his camp, this disgrace was amply compensated by the captivity of that active leader, who was soon after seized while hunting by a marauding party of Turkomans, and died in confinement, while the remaining dependencies of Edessa, the fortresses of Aintab, Tellbasher, Ravendan, &c., fell almost without resistance into the power of Noor-ed-deen, whose dominions now included the whole of Northern Syria. Modjir-ed-deen was still the nominal ruler of Damascus and the southern portion, but the government was entirely in the hands of his vizier Moin-ed-deen Anar, whose daughter Noor-ed-deen had married; and after the death of this able minister, the inhabitants, alarmed at the capture of Ascalon by Baldwin III. in 1153, and dreading an attack from the Christians, voluntarily offered their allegiance to Noor-ed-deen (1154) as the price of his protection; the weak Modjir-ed-deen resigned his power, and sought an asylum at the court of the caliph of Bagdad, which then seems to have been the usual retreat of deposed princes; while Noor-ed-deen, the circuit of whose realms now encompassed on all sides by land the Latin territories in Palestine, and extended to the frontiers of the Fatimite possessions in Egypt, fixed his capital at Damascus, which he raised from the ruinous state in which it had been left by an earthquake, and adorned with mosques, fountains, colleges, and hospitals. Several years of continual but varied warfare against the Christians followed the union of all the Moslem power of Syria under a single head; the sway of Noor-ed-deen was from time to time enlarged by acquisitions, not only from the enemies of Islam, but from the sultan of Iconium and the minor Moslem princes of Mesopotamia; but a malady which attacked him in 1159, followed by a false report of his death, might have occasioned a fatal reverse in his fortunes, but for the prudence of Ayoub (the father of the famous Salah-ed-deen, or Sala-

din), who controlled the impatience of his brother Assed-ed-deen Shirakoh to take advantage of the supposed decease of their patron. The Greek emperor Manuel Comnenus was preparing at this time to attack Aleppo in concert with the Franks of Antioch; but this new enemy was diverted by negotiation, and by the release of 6000 Greek captives; and the only advantage reaped by the Christians from this crisis was the capture of the fortress of Al-Harem near Antioch. The death of Baldwin III. in 1162 released Noor-ed-deen from the ablest of his antagonists, his brother and successor, Almaric, or Amaury, being far inferior to Baldwin both in prowess and abilities; the war however was prosecuted with unabated vigour and various success: on one occasion, at the siege of Hissn-al-Akrad (the castle of the Koords), the Moslem leaguer was surprised by the Templars, and their monarch himself escaped death or captivity only by the self-devotion of an attendant; but this discomfiture was speedily retrieved by a victory in which the famous Reginald de Chatillon, prince of Antioch, was taken prisoner, and which was followed by the recapture of Al-Harem. But the state of affairs in Egypt, where the Fatimite caliphate was now tottering to its fall [FATIMIDES], opened new views of aggrandisement and a wider field of ambition to both the Christian and Moslem rulers of Syria; the descendants of Ali had become puppets in the hands of their vizier, or Emiral-Joyush (generalissimo), who wielded all the real authority of the state: two emirs, Dargam and Shawer, had contested in arms this high dignity; and the latter, defeated and expelled from Egypt, sought refuge and aid from Noor-ed-deen. The sovereign of Damascus eagerly embraced the opportunity of obtaining a footing in Egypt, and despatched a force under Shirakoh and his nephew Salah-ed-deen to reinstate Shawer (1163); whose rival called in the Christians of Palestine to his support: but ere Amaury could enter Egypt, Dargam had been overpowered and slain by Shirakoh, who replaced Shawer in his former power. But Shawer, faithless alike to friend and foe, now entered into arrangements with the Franks in order to elude the fulfilment of his engagements with Noor-ed-deen; and Shirakoh, after maintaining himself for some time in Belbeis against the joint forces of Jerusalem and Egypt, was compelled to enter into a convention with Amaury and evacuate the country. But he was soon recalled by Shawer to deliver him from the vengeance of his new allies, to whom he had proved as perfidious as to those of his own faith; Cairo was closely besieged by the Franks, and the Fatimite caliph Aded Ledin'illa sent the hair of his women, the extreme symbol of Oriental distress, to implore the succour of Noor-ed-deen (1168). Shirakoh again entered Egypt with an army, forced Amaury to retreat, and after beheading the double traitor Shawer, installed himself in the twofold office of vizier to the Fatimite caliph, and lieutenant of Egypt in the name of Noor-ed-deen; but dying the same year, was succeeded in his dignities by his famous nephew Salah-ed-deen. [SALAH-ED-DEEN.]

While these events were passing in Egypt, Noor-ed-deen in person pushed his successes in Syria against the Christians, from whom he took Paneas and many other important places; Mesopotamia, ruled by his nephews, acknowledged his supremacy as head of the family; he was now, by his officers, absolute master of Egypt, and the fleets of Damietta and Alexandria were directed against the sea-coast of the kingdom of Jerusalem; but a religious conquest was yet wanting to complete his triumph; as a rigid adherent of the orthodox or Sooni sect of Islam, he revered the Abbaside caliph of Bagdad as the legitimate commander of the faithful; and the schismatic caliphate of the Fatimites, of which a phantom still remained secluded in the palace of Cairo, was an abomination which he determined to destroy. In obedience to his repeated commands, Salah-ed-deen (A.D. 1171, A.H. 567) substituted the name of the Abbaside caliph Mostadhi in the public prayers for that of Aded, who died eleven days after, in ignorance, it is said, of his deposition; the Sheah heresy was for ever abrogated in Egypt, and Noor-ed-deen, as the champion of orthodoxy, received from the gratitude of Mostadhi the direct investiture of Egypt and Syria as fiefs of the caliphate; two swords and two robes of honour were sent from Bagdad as emblems of his sway over two kingdoms; and he exchanged the title of emir, or sahib, for the higher appellation of sultan, which the etiquette of that age conceived to be attached to an immediate grant from the head of the Moslem faith. His name was recited with that of the caliph in all the mosques

\* Abulfeda.—D'Herbelot places this event three years later, evidently confounding the death of Amad-ed-deen with that of his eldest son Seif-ed-deen Ghazi, prince of Moossol, and brother of Noor-ed-deen. Abul-Faraj dates it one year earlier than Abulfeda.

† Modjir-ed-deen is inadvertently called by Von Hammer, in his 'History of the Assassins,' the last of the Seljukides of Damascus; he was not of the Seljuk family at all, but the great-grandson of the Turkish emir Togtekin (the Doldequin of the Crusaders), who supplanted the children of Dakak the Seljukide, at Damascus, in 1103 or 1104.



throughout his dominions, and even in the holy cities of Mekka and Medina, which Tooran-shah, brother of Salah-ed-deen, had reduced as dependencies of Egypt; but the power and glory of Noor-ed-deen had now attained their highest pitch, the three remaining years of his life were unmarked by any memorable achievement, and disquieted by forebodings of the future downfall of his house by the ambition of Salah-ed-deen, who, though still ostensibly acting as his lieutenant, and making public professions of loyalty and obedience, had in fact become independent master of Egypt, and eluded or disregarded all the orders of his nominal sovereign. The reluctance of Salah-ed-deen to join his forces with those of Noor-ed-deen in an expedition which the former had planned against the fortress of Karak, or Mont-Royal, at length brought these smouldering jealousies to the verge of an open rupture; and Noor-ed-deen was preparing\* to march into Egypt to reduce or expel his refractory vassal, when an attack of quinsey terminated his life at Damascus, May 26, 1173 (Shawal 21, 569). His son Malek-al-Salah Ismail, a youth eleven years old, succeeded to the titular sovereignty of his extensive dominions; but was speedily stripped by Salah-ed-deen of Damascus and the greater part of Syria, and died eight years afterwards, reduced to the sovereignty of Aleppo and its dependencies, which were then absorbed, after an ineffectual attempt to claim them on the part of his cousins, the atabeks of Moossoul, into the wide-spread realm of Salah-ed-deen. Noor-ed-deen is described by Abulfeda as tall and well proportioned in person, of olive complexion, and with little or no beard; in the estimate of his character he has had the rare good fortune to unite the suffrages of his adversaries to those of his friends: William of Tyre ('Gesta Dei per Franco') describes 'Noradin' as 'a prudent and discreet man, who feared God according to the faith of his people;' and the eulogies of the Moslem writers prove that the titles of Malek-al-Adel (the just prince) and Noor-ed-deen (Light of the Faith), were not idle or groundless assumptions. With the constant practice of the two princely virtues most esteemed in the East, justice and liberality, he combined the strictest attention to the duties prescribed by his faith; and while wearing neither silk nor gold, nor expending on his dress or nourishment more than the fifth which was his just share of the spoil, he distributed every month 5000 dinars among the poor, and munificently maintained the hospitals and charitable foundations throughout his dominions. The Dar-al-Adl, or chamber of justice, which he established to control the excesses of his military chiefs and their retainers, was the terror of the great and the refuge of the poor; and such was the affection which his subjects bore to his memory, that, some years after his death, his name was invoked in the streets of Damascus by an oppressed suitor, who thus obtained from the reigning monarch the redress which had been previously denied him. Abulfeda sums up his character by declaring that his virtues were both too numerous and too splendid to be comprehended within the limits of his history; and the sentence of future ages, which has placed him among the number of the Moslem saints, has ratified the judgment of his contemporaries. (Abulfeda; Abul-Faraj; De Guignes, *Histoire des Huns*; D'Herbelot, *Biblioth. Orient.*; Von Hammer, *History of the Assassins*.)

NOUREDDIN (Malek-al-Afdal Noor-ed-deen Ali), the eldest of the seventeen sons of Salah-ed-deen; born A.D. 1170, A.H. 565. In the partition of his father's extensive dominions, which followed his death in 1193, Damascus and Southern Syria with Palestine fell to the lot of Noor-ed-deen; but in the dissensions which soon followed, he was stripped of his kingdom by his uncle Seif-ed-deen Abubekr (the Saphadin of Christian writers), and his brother Othman, sultan of Egypt (1196). In a poetical address to the caliph Nasser, he lamented the similarity of his own fate to that of the caliph *Ali* Ebn Abu-Taleb (his namesake) in being thus excluded from his rights by *Abubekr* and *Othman*; the caliph in his reply consoled him by the assurance that in him he should find the *Nasser* (protector) whom *Ali* had sought in vain; but the intercession of the caliph was unavailing to procure the restitution of any part of his territories; in 1198 however, on the death of his brother, the sultan of Egypt, Noor-ed-deen became *atabek*, or guardian, to his

infant nephew Malek-al-Mansor, and attempted, by the aid of another brother, the sultan of Aleppo, to recover Damascus from his uncle; but the expedition failed, and Seif-ed-deen retaliated by invading Egypt, and expelled both the young sultan and his guardian. The unfortunate Noor-ed-deen now retired to Samosata, where he died, apparently without issue, A.D. 1224, A.H. 621. He is generally mentioned by Eastern writers under his assumed title of Malek-al-Afdal (the excellent prince).

NOUREDDIN, or NOOR-ED-DEEN ARSLAN SHAH, *atabek*, or prince, of Moossoul and Mesopotamia, of the family of Zenghi, and grand-nephew of the famous Noor-ed-deen, sultan of Aleppo and Damascus, succeeded his father, Azz-ed-deen Massoud, A.D. 1193, A.H. 589 (the year of the death of Salah-ed-deen). During a reign of eighteen years, he re-established in some measure the declining power of his house, and compelled the minor princes of his family, who occupied appanages on the frontiers of his territories, to acknowledge his supremacy as lord paramount. An attack with which he and his relative Kootbed-deen, prince of Sandjar, were threatened in 1209 from the overwhelming power of Seif-ed-deen, brother of Salah-ed-deen, was averted by the mediation of the caliph of Bagdad; and Noor-ed-deen died the next year, A.D. 1210, A.H. 607, regretted by his subjects as a mild and beneficent ruler. His son Azz-ed-deen, after a reign of between seven and eight years, was succeeded by an infant son bearing the title of Noor-ed-deen Arslan II, who survived only a few months. (Abulfeda; Abul-Faraj; De Guignes.)

NOUREDDIN (Malek-al-Mansor Noor-ed-deen Ali), the second sultan of the dynasty of Tartar or Baharite Mamlukes in Egypt, was placed on the throne by the emirs after the assassination of his father, Ibek, A.D. 1257, A.H. 655, at the age of fifteen. (Makrizi.) In the Latin version attached to Carlyle's edition of the 'Maured-Allatafet,' his age is inadvertently given as twenty-five, but the Arabic text agrees with Makrizi.) His short reign of two years was troubled by continual feuds among the Mamluke chieftains, and attempts on the part of the Ayoobite princes of Syria to recover the lost sway of their family in Egypt; and the apprehension of an irruption of the Moguls under Hulaku, who had taken Bagdad and destroyed the caliphate, showed the necessity of substituting a ruler of matured years and experience. The emir Kotuz accordingly assumed the reins of government, A.D. 1259, A.H. 657, and no more is heard of Noor-ed-deen.

NOVA SCOTIA, a British colony in North America, is situated between 43° 20' and 46° N. lat. and between 61° and 66° 20' W. long. It is surrounded by the sea, except at its north-western extremity, where the isthmus of Chignecto, which is nearly eleven miles across, unites it to New Brunswick. On the west side of Nova Scotia is the Bay of Fundy; on the south and east the Atlantic; on the north it is divided from the island of Cape Breton by the Gut of Canso, a strait about twenty-one miles in length, and varying from a mile to a mile and half in width; and from Prince Edward's Island by Northumberland Strait, which is about 14 miles wide at the narrowest place between Nova Scotia and the island. Its extreme length, from Cape Canso on the east to Cape St. Mary's on the west, is 280 miles. Its breadth varies from about 50 to 100 miles. It contains nearly 16,000 square miles, or almost two-thirds of the area of Ireland.

*Coast.*—Along the shores of the Atlantic, from Cape Canso to Cape Sable, the coast is rocky and rather high, though steep cliffs rarely occur. This coast-line is indented by numerous inlets, which penetrate into the rocky masses from three to fifteen miles, and form a great number of deep and safe harbours. The shores are lined with rocks and thousands of islets, between which and the coast during the most boisterous weather small vessels sail in smooth water, while there is a heavy sea in the open ocean. There is deep water almost without exception close to the rocks and islands and in the harbours. The most extensive of the inlets are Halifax Harbour; Margaret's Bay, which is less than two miles broad at the entrance, but widens to six miles, and is fourteen long; and Mahon Bay, separated from Margaret's by the lofty peninsula of Aspotagoen, which is about ten miles wide and twelve deep, and contains above 200 islands; and Shelburne Harbour. The coast along the south-western extremity of the province, between Cape Sable and Cape St. Mary's, resembles the southern shores. Cape St. Mary's on the south and Briar's Island on the north form the entrance of St. Mary's Bay, which is 35 miles deep and from

\* D'Herbelot (*Bibl. Or.*, art. 'Noureddin') says, 'He entered Egypt at the head of a powerful army, carried the capital by assault, and constrained Saladin, brave as he was, to fly before him;' but this is one of those inaccuracies which disfigure that valuable compilation.

4 to 10 broad; Briar's Island, Long Island, and a peninsula called Digby Neck, separate it from the Bay of Fundy. The coast along the Bay of Fundy, from Briar's Island to the entrance of the Basin of Mines, runs in one continuous line, without a break except the Gut of Digby, by which the Annapolis Basin is entered. The Gut is narrow but leads to one of the most beautiful harbours of America, the Annapolis Basin, which extends, with a width varying between one and four miles, ten miles parallel to the Bay of Fundy. The shores of the Bay of Fundy are less rugged than the southern shore, but still bold and generally high. As there is no harbour on this coast east of the Gut of Digby, a pier has been erected at Black Point, which affords safety to coasting vessels. The Basin of Mines is one of the two great branches in which the Bay of Fundy terminates. Its entrance is through a strait about three miles wide, with bold and abrupt shores. It widens inside from eight to sixteen miles, and extends about fifty miles to the head of Cobequid Bay. The tides at full and change rise from 50 to 60 feet, and ascend the rivers to a distance of 15 miles. The shores of the Basin are low, and large tracts of very fertile land have been gained from the sea by embankments. The shores from the entrance of the Basin of Mines to Cape Chignecto, and from Cape Chignecto along Chignecto Bay to the Boar's Back, are high and rocky, but the innermost recess of Cumberland Basin has low shores, and extensive tracts of dyke-land have been formed here likewise. Chignecto Basin is the other great branch of the Bay of Fundy. It extends about twenty miles, with an average breadth of eight miles, and then divides into two minor branches, Cumberland Basin and Shepody Bay; the latter is in New Brunswick, and the former divides New Brunswick from Nova Scotia. The northern shores, along Northumberland Strait west of Pictou Harbour, are low, and partly muddy, partly sandy, except near Pugash Bay, where they are high. East of Pictou they are much higher, and from Cape St. George they are generally rocky and bold. Chedabucto Bay is 25 miles long and from 6 to 12 wide. The entrance is between Cape Hogan on Madame Island, which belongs to Cape Breton, and Cape Canso. It is altogether free from islands and cliffs.

*Surface and Soil.*—The lowest depression of the country seems to occur about 63° 30' W. long., between Halifax Harbour on the south and Cobequid Bay on the north. The summit-level of the Shubenacadie Canal, which traverses it, does not rise to the elevation of 100 feet above the sea. The country to the west of that depression may perhaps on an average be about 300 feet above the sea-level. Its surface, though far from being level, does not appear to present any great inequalities, and has a hilly character only in that part where it descends towards the west, north, and east. The ascent from the southern and rocky coast is very gradual. The most hilly and probably the most elevated district occurs towards the most western extremity, west of Lake Rossignol, in the heights called the Blue Mountains. This district seems to extend northward to the vicinity of Annapolis Basin. Along the Bay of Fundy two ridges of hills of moderate elevation enclose the valley of the Annapolis river. The southern of these ridges probably does not rise above the table-land occupying the interior. On the eastern edge of this table-land, at a distance of from eight to ten miles from the Basin of Mines, several high hills occur, as Horton Mountain and Ardoise Mountain; the latter is considered to be the most elevated land in Nova Scotia, and rises to about 700 feet above the sea. The table-land is unknown as far as concerns the qualities of the soil, no settlements having been made on it; but it appears that the greatest part of it is covered with forests, which contain timber fit for ship-building and other purposes. A great number of lakes are dispersed over its surface, among which Lake Rossignol is said to be thirty miles long. The lakes are most numerous between Annapolis and Liverpool, where they constitute a water communication across the country. The tract along the southern coast, and for several miles inland, is generally naked and barren, the soil being occupied by rocks and stones: in some places it is covered with low trees and bushes, but in general it is unfit for cultivation. In a few places, where the land has been cleared of the stones, moderate crops of barley and oats are obtained. At the head of the bays and on the lower course of the rivers there are tracts of alluvial soil which yield good crops; but these cultivable tracts constitute a very small portion of the whole, and hence the inhabitants of the scattered

settlements of this country are almost exclusively occupied with fishing and preparing and bringing down the timber from the interior. The vicinity of Halifax constitutes an exception, though here also the soil is of an indifferent quality. The country contiguous to the western coast between Cape Sable and Cape St. Mary, though generally rocky and sterile, contains a much greater proportion of arable land. The country improves considerably on the shores of St. Mary's Bay, and still more along those of the Bay of Fundy. Though the elevated ridge which runs along this bay is also stony, it has a superior soil, and gives abundant crops of wheat and other grains, and has extensive orchards: its cider is much esteemed. The valley through which the Annapolis River flows is also equally fertile, but cultivation has not extended from it to the more elevated country lying south of the valley.

The country surrounding the Basin of Mines is the most fertile and the best settled portion of Nova Scotia. It contains several thousand acres of the most fertile marsh or dyke lands, which owe their origin to the extraordinary velocity with which the tides rush into the bay, depositing vast quantities of alluvial matter on the shore. Where it has been possible to exclude the tides by embankments, these tracts have been converted into the finest meadows, and may also be cultivated with advantage. There are also extensive alluvial tracts along the rivers which are very fertile; and even the uplands, which occupy the tracts between the river courses, though less fertile, repay the labour bestowed on them. A few sandy tracts occur, but they are of comparatively small extent. The peninsula which divides the Basin of Mines from Chignecto Basin has a stony soil, but a considerable degree of fertility. At the innermost corner of Cumberland Basin there are also marshes, though less extensive than those on the Basin of Mines. They are likewise partly produced by the tides, and partly by the alluvial deposit brought down by several small rivers which empty themselves into Cumberland Basin.

The eastern portion of Nova Scotia resembles in most respects the western, constituting in the interior a table-land, from 200 to 300 feet above the level of the sea, and with a slightly irregular surface. It is likewise for the most part covered with forest-trees, and contains several lakes in the eastern districts. The high lands appear to extend with undiminished elevation to the vicinity of the northern coast; but along the northern coast they terminate at 12 miles from the shores, and the interval is occupied by a long slope, broken into hills and dales. A portion of the peninsula between the Basin of Mines and Northumberland Strait is occupied by a cluster of hills, called the Cobequid Mountains. The soil of the country contiguous to Northumberland Strait, though not of first-rate quality, is rich enough to repay the labour bestowed on it. This country also contains rich mines of coal and iron. These advantages, united to a very profitable fishery, and the vast forests of timber-trees, will give some idea of the value of this country. The country adjacent to St. George's Bay, the Gut of Canso, and Chedabucto Bay, is much less fertile, and the inhabitants are mostly engaged in fishing. The coast from Cape Canso to Halifax Harbour is by far the most rugged and barren in Nova Scotia: it is also more thinly settled than the rest, and the number of agricultural settlements is very small. The scattered population are occupied in the timber-trade and fishery.

*Rivers.*—The number of rivers is very great, but their course is short. Nearly all of them form good harbours at their mouths, though they are generally only fit for moderate sized vessels. Most of the rivers have rapids not far from the sea, which however do not prevent them from being used to float down the timber from the interior. The most remarkable are the Annapolis River and the Shubenacadie. The Annapolis River originates in the high land which forms the southern side of the entrance of the Basin of Mines, and runs west-south-west about 90 miles. It becomes navigable about 25 miles from the Gut of Digby, which may be considered as its mouth. The Shubenacadie River rises in a chain of lakes situated north of Halifax, and beginning about two miles from that town. The most northern of these lakes is called the Great Lake: the river issuing from it runs northward 55 miles, when it discharges itself into the Basin of Mines. At its mouth it is a mile wide; the tide ascends more than 10 miles, and it is navigable for about 30 miles more. This river and its lakes supply the Shubenacadie Canal with water, by which a

communication between the Bay of Fundy and Halifax has been established for ships drawing not more than eight feet of water.

**Climate.**—The climate is colder than that of England, but it varies considerably in the different parts of the country. Along the southern and western coast there are several harbours which are never frozen; but the harbour of Pictou, on Northumberland Strait, is usually closed by ice for four months. In Argyle Bay, at the western extremity of the peninsula, the thermometer sometimes sinks to zero, and in summer it rises, though rarely, above 80°; yet the mean annual temperature is stated to be 48°, or only two degrees less than that of London. Along the northern coast however the frost generally continues from the end of December to the beginning of April, and sometimes longer; and during this time there are very heavy falls of snow. The spring, as in the northern countries of Europe, is very short. As soon as the frost and snow disappear, the country is clothed with a vigorous vegetation, and the heat becomes sensible, though it is never oppressive, even in August, when it is greatest. The autumn is the finest portion of the year, on account of the constancy of the weather and the moderate temperature. In November or December the rains set in: these months and April are the most rainy part of the year, but in general the quantity of rain which falls is moderate. Fogs prevail on the southern shores and at the entrance of the Bay of Fundy in June, July, and August, but they do not extend far inland. The climate is everywhere very healthy.

**Productions.**—Wheat is grown on the better lands, but if not cultivated with care it does not succeed. The quantity grown is not sufficient for the consumption of the colony, and a considerable quantity of flour is imported. Indian corn is extensively cultivated along the Bay of Fundy, though it is not much used as an article of food. Rye, oats, barley, and potatoes are the principal articles which are raised. Turnips, beans, and buckwheat are also generally cultivated. As the cattle are housed in winter, the culture of grasses is one of the principal objects of agriculture. There are extensive orchards along the Bay of Fundy and in the country which surrounds the Basin of Mines; and the cider, which forms a considerable article of export, is inferior to none in America. Peaches and grapes ripen in ordinary seasons without any artificial aid.

Cattle and sheep are very numerous, especially in the country about the Basin of Mines and along the northern shores. Beef and butter make a considerable article of export. The fleece of the sheep, which is tolerably fine, is used for domestic purposes. Horses are not numerous, and the breed is indifferent. Hogs are tolerably numerous.

The forests are one of the sources of the wealth of the country; they consist of pine, birch, oak, hemlock, beech, ash, maple, and elm, all of which make articles for exportation: there are other trees of great beauty, but less value. The wild animals are the moose-deer, bear, tiger-cat, fox, marten, otter, mink, beaver, musk-rat, porcupine, racoon, weasel, squirrel, and hare; all of which, except the two last, have decreased very rapidly in number. The lakes and rivers abound with fish, and the sea along the coast contains abundance of cod, mackerel, herring, shad, alewives, salmon, halibut, sturgeon, sole, and some other fish of less value; lobsters, oysters, and different kinds of shell-fish are abundant. Perhaps one-third of the population subsists on the produce of the fisheries, which are carried on along the shores and on the coast of Labrador.

The eastern portion of Nova Scotia is very rich in minerals. Coal has been discovered at least in ten places between the isthmus of Chignecto and Merigomish, and the great coal-field of Pictou occupies an area of more than one hundred square miles; the seams vary in thickness from one to fifty feet; the seam at the Albion coal-mine is more than fifty feet in thickness; it consists of several distinct layers; the upper or main layer being generally thirty-six feet thick. Great quantities of coal are shipped from Pictou to the United States for the use of steam-vessels. Iron-ore abounds in the same district, but it is not worked; it is also found in abundance in the vicinity of the Annapolis Basin, on the banks of the small river called Moose, where it is worked by the Annapolis Iron Mining Company; the ore is very good. Indications of copper and lead occur along Northumberland Strait. Above 100,000 tons of gypsum are annually shipped to the United States for manure; it occurs in several places, and is extensively worked on the

shores of the Basin of Mines, Cumberland Basin, and St. George's Bay. Salt-springs are numerous in the north-western district, west of a line drawn from the innermost recess of Cobequid Bay to Pictou. Slate, freestone, and grindstone are worked in several places, principally for domestic use; grindstones are annually exported to the amount of 10,000 to the United States.

**Population, &c.**—The population of the peninsula of Nova Scotia, which in 1817 amounted to 84,913, had increased to 123,848 in 1827, since which year no census has been taken: this increase was equal to rather more than 4½ per cent. annually, some part of which was caused by immigration, but to what extent is not known. The division of the population among the different counties and districts was, in 1827, as follows:—

	Males.	Females.	Total.
Halifax County:—			
Peninsula of Halifax	6,867	7,572	14,439
District of Halifax	5,178	4,969	10,437
District of Colchester	3,921	3,782	7,703
District of Pictou	7,262	6,687	13,949
Hants County	4,820	4,107	8,627
King's County	4,293	4,916	10,208
Annapolis County	7,491	7,170	14,661
Shelburne County	6,133	5,886	12,018
Queen's County	2,187	2,038	4,225
Lunenburg County	4,846	4,559	9,405
Cumberland County	2,853	2,563	5,416
Sydney County	6,685	6,075	12,760
	63,536	60,312	123,848

The number of births in the year 1827 was 4563, or 1 in 27; the number of marriages was 946, or 1 in 131, and of deaths 1908, or 1 in 65, which last proportion, if the registers are correctly kept, indicates great salubrity in the climate.

The population of the colony is of a mixed character. It consists of four distinct classes: the Indians, or aborigines—part of the tribe of Micmacs—who do not exceed 600 in number; free negroes, of whom there are about 2000; Acadians, descendants of the French, by whom the country was partially settled before its conquest by the English, and whose numbers do not much exceed 6000; the remaining class, who form the main body of the population, are the descendants of colonists from Germany, of refugee royalists from the former British provinces of North America, and emigrants from all parts of the United Kingdom, but more especially from Scotland. The Acadians are Roman Catholics; they settle together as much as possible, preserve their religion, language, and customs, and never intermarry with their Protestant neighbours: the descendants of the other nations are so mixed together that all distinctive characteristics are lost.

Acadia was the name given to Nova Scotia and the adjacent countries when they were under the dominion of France.

The province is divided into nine counties, exclusive of the island of Cape Breton, which is included within the government. These counties, which have already been enumerated, are subdivided into 48 townships, which are not all of equal extent; their inhabitants meet together to authorise the raising of money for local purposes.

Halifax, the capital of the province, in 44° 40' N. lat. and 63° 38' W. long., is built on the declivity of a hill, the summit of which is 240 feet above the sea. It stands at the western side of the harbour, which is spacious, safe, and accessible at all seasons of the year. There is space within it for 1000 vessels to ride in safety. It is entered by a creek sixteen miles long, which terminates in a sheet of water called Bedford Basin, the area of which is ten square miles. The mouth is protected by a small island forming two passages into the harbour, one of which, the eastern passage, can be used only by small vessels. Opposite to the town is another small island, George Island, which is strongly fortified. The town is regularly laid out, and the streets are for the most part paved or macadamised. Including the suburbs, the town is two miles long and half a mile broad; it contains 2 churches, 1 Roman Catholic chapel, and six chapels for Protestant dissenters. The 'Province Building,' in the centre of the town, is a handsome well-built edifice of freestone, 140 feet long, 70 feet wide, and 42 feet high. It contains the chambers of meeting for the legislative body, the custom-house, the offices of the provincial govern-

ment, and the superior law courts. The court-house, in which the courts of Common Pleas and the Sessions of the peace are held, is a plain brick building. It contains an exchange-room for the merchants. Halifax is the principal naval station in British America, and in time of war its possession is of great importance: it contains a well-appointed naval arsenal. At the last census, in 1827, the town contained 1580 houses; since that time it has been much improved and enlarged. It is the seat of government for the province, and carries on a considerable trade with the United Kingdom, the West India Colonies, and the United States. The post-office packets which convey the correspondence between Europe and British America arrive at Halifax from Falmouth once in every month.

Opposite to Halifax, on the eastern side of the harbour, is the small town of Dartmouth; it was a thriving place during the war, but has not increased since. A steam-boat is constantly employed for the conveyance of passengers from one town to the other.

Truro, a town containing about 100 houses, mostly built of wood, stands at the head of the Basin of Mines. It contains a church and a court-house, and returns one member to the House of Assembly.

Pictou, on the Straits of Northumberland, opposite to Prince Edward's Island, contains a population above 3000. There are an Episcopal, a Catholic, and two Presbyterian chapels. A considerable trade is carried on in lumber and coal; as many as 108 vessels have been loaded with timber for England in a single year. The harbour has a bar at its mouth, but within it is capacious, and has from 5 to 9 fathoms depth of water.

Dorchester is situated a mile above the navigation on Antigonish river. It has a considerable trade in proportion to its size, and contains a court-house, a Baptist, a Presbyterian, and a Roman Catholic chapel.

Guysborough stands on the western side of Milford Haven, at the head of Chedabucto Bay. It contains a court-house, an Episcopal church, Roman Catholic and Protestant Dissenters' chapels.

Amherst stands near the isthmus which divides the Bay of Fundy from Northumberland Strait. It is a small but thriving place.

Windsor, the county town of Hants, stands at the confluence of the St. Croix and the Avon, about 40 miles north from Halifax. It contains a college, an academy, an Episcopal church, a Roman Catholic chapel, and places of worship for many sects of Protestant Dissenters.

Chester is a thriving town on the north side of Mahon Bay, about 9 miles from its entrance. It contains several saw, grist, and fulling mills, and carries on a considerable lumber trade. Many of its inhabitants are engaged in the fishery.

Lunenburg, a regularly built town, contains about 300 houses and four churches and chapels. It carries on the lumber trade with the West India Colonies.

Liverpool, the shire town of Queen's county, is well built. It stands on the west side of the harbour. The inhabitants are mostly engaged in the lumber trade and fishery, which afford exports to Europe and the West Indies. Liverpool harbour is never frozen, and is accessible at all seasons of the year.

Annapolis, the county town of the county of the same name, stands on a peninsula which projects into the Gut of Digby. It has not advanced in size or population for many years. Annapolis was the capital of the province under the French, who called it *Port Royal*. It continued to be the seat of government until 1760, when Halifax became the capital of the province.

Shelburne, in the county of that name, was built by American loyalists immediately after the recognition of the independence of the United States. Within a year after it was founded, the town is said to have contained 12,000 inhabitants, but it soon began to decline, and is now almost deserted. The town stands at the northern extremity of an inlet 10 miles deep and two miles wide. The few inhabitants that remain are employed in fishing and ship-building.

Yarmouth, also in Shelburne county, on the west coast of the province, contains about 100 houses, and consists of one street nearly two miles long, but the dwellings are not placed close together.

The affairs of the province are administered by a lieutenant-governor, subordinate to the governor-general of

British North America, a council of 12 members appointed by the crown, and a house of assembly, consisting of 41 members, elected by forty-shilling freeholders. The assembly is elected for seven years, but may be dissolved or prorogued at the pleasure of the lieutenant-governor: it must meet every year.

The bishop of Nova Scotia and the chief-justice of the province are ex-officio members of the council: the latter acts as its president. The laws are administered by a court of queen's bench, which holds its sittings in Halifax, and by district courts, as in the provinces of Canada. The common and statute law of England are in force, together with the statutes passed by the provincial parliament, and allowed by the queen in council.

The militia of the province, in 1836, comprised 1063 commissioned officers and 22,488 non-commissioned officers and privates.

The exports of the province consist principally of lumber and the produce of the fisheries. Of the first description of produce there were shipped, in 1836, of pine, birch, and ash timber, masts, deals, shingles, and staves, to the value of 115,620*l.*, and the shipments of cod, herrings, mackerel, salmon, and fish oil, amounted to 186,908*l.* In the same year there were exported 31,489 tons of gypsum, 42,587 tons of coals, and agricultural produce, valued at 26,063*l.* The total value of exports was 446,097*l.* The imports, which consisted principally of British manufactured goods and West India produce, amounted in value to 733,540*l.* Included in this amount there were 347,176 bushels of salt, and agricultural produce, valued at 85,558*l.*

The shipping that entered and cleared from the province in 1836 was:

	Inwards.		Outwards.	
	Ships.	Tons.	Ships.	Tons.
Great Britain	108	29,544	112	30,931
British Colonies	2,295	147,781	2,540	170,407
United States	965	97,689	902	90,399
Foreign States	36	6,119	20	2,783
	3,404	381,133	3,574	294,520

(*McGregor's British America*; Bouchette, *British Dominions in North America*.)

NOVA ZEMBLA, a corruption of the Russian name of Novaia Zemlia (new land), designates an island situated in the Arctic Ocean, between 70° and 76° N. lat. and 52° and 66° E. long. It extends in length from south-south-west to north-north-east nearly 400 miles, but its width, so far as it is known, does not exceed 50 miles on an average, though in our maps it still occupies double that extent from west to east. It is divided from the island of Waigats, which lies farther south, by the Strait of Kara, which is more than 30 miles wide. Zembla properly consists of several islands; at least it is known that between 73° and 74° N. lat. a strait, called Matotshkin Shar, divides it into two islands, and it is very probable that some inlets, farther north, are likewise straits; but it has hitherto been found impossible to advance far into them, since even in the midst of summer they are closed with ice. The island south of the Matotshkin Shar has been recently surveyed by Russian seamen, but more than one-half of the eastern coast of the island north of the strait has always been found so closely beset with ice, as to prevent all farther progress. The western coast, up to Cape Nassau, the most northern point of the island, is known. It appears that the wide arm of the sea which lies between Novaia Zemlia and the extensive headland separating the Bay of Kara from the wide gulf into which the Oby river flows, is always encumbered in its northern part with close masses and fields of ice. No vessel, and not even a boat, has yet succeeded in making its way to the east far enough to reach the gulf of the Oby.

The land on the western side of the island is mountainous, rising from a steep and bold shore to the height of 1000 and 2000 feet. The highest mountains are near the western entrance of the Matotshkin Shar, where several summits attain more than 2000 feet above the sea-level. The most elevated mountain is on the strait itself, and is 3475 feet high. The eastern shores are comparatively level, especially towards the south. Though the heat in summer is very great, owing to the long continuance of the sun above the horizon (four months and a half at the northern extremity), the soil thaws only to the depth of between six inches and two feet and a half, and at that distance from the surface ice is always found. The vegetation, which

covers some parts of the surface, consists only of lichens and mosses. White bears, foxes, walruses or morses, and seals abound, as well as rein-deer and water-fowl. The islands are frequently visited by fishermen from Arkangel and other places in order to take the walrus. Nova Zembla first became known by the voyage of Steven Burrough (1556), but had previously been visited by the Russians. The Dutchman, William Barentz, passed the winters of 1596-7 in Icy Haven, near the most northern extremity of the island. The Russian government in recent times has sent several expeditions to explore the islands, as already observed, but they have not yet completely succeeded in this object. (Barrow's *Chronological History of Voyages into the Arctic Regions*; *London Geog. Journal*, vol. viii.)

NOVACUL'NA (Benson), the name of a conchifer belonging to the *Solen* family. [SOLENDÆ.]

NOVA'LIS, the literary name assumed by Friedrich von Hardenberg, who was born in 1772, at a family estate in Mansfeld. His father, Baron von Hardenberg, had been a soldier in his youth, and was director of the Saxon salt-works. Himself and his wife, the mother of Novalis, belonged to the religious society of *Hernhuters*. Novalis was the eldest of eleven children, and was very delicate in his earlier years. He was of a dreamy nature, and displayed no extraordinary talent, till a dangerous illness, which attacked him in his ninth year, and could only be cured by painful remedies, awoke him from a kind of intellectual slumber, and he appeared thenceforward as a lively and intelligent child. His diligence was great, and in his twelfth year he possessed considerable knowledge of the Latin and some acquaintance with the Greek language. He displayed a great predilection for tales (*Mährchen*), some of which he invented for the amusement of his brothers. In 1789 he attended a gymnasium, and in the following year went to study at Jena, where he remained till 1792, when he went with his brother Erasmus to the university of Leipzig. In the succeeding year he removed to Wittenberg, where his studies were completed.

At this time he became acquainted with Frederic Schlegel, and also with Fichte, whose system of philosophy, called the *Wissenschaftslehre*, he studied with ardour. On leaving Wittenberg he went to Arnstadt, to attend for the first time to practical business. He soon became acquainted with a neighbouring lady, called by his biographer Sophia von K., of whom he became violently enamoured. In 1795 he went to Weissenfels, and was made auditor of the department of which his father was director. The death of Sophia and of his brother Erasmus, both in the year 1797, was a great shock to Novalis; he however pursued his business with activity, and it is about this time that his 'Hymns to Night' are supposed to have been written.

In 1798 he was betrothed to a lady called Julia von Ch., and about this time he wrote his 'Pupils at Saïs.'

Returning to Jena, he became acquainted with August Wilhelm Schlegel, and with Tieck, the romance writer, and author of the biography to which we are indebted for all the information that we have respecting the life of Novalis. In 1800 the romance 'Heinrich von Ofterdingen' was commenced by Novalis, and was, as he explains in a letter to his friend Tieck, designed to be an apotheosis of poesy. This singular work was never finished, although the plan of its conclusion is preserved. The hero, Heinrich, is an old German poet, supposed by some to be the author of the 'Nibelungen-lied,' and the purpose of the work is to show the whole world, with every profession and pursuit, on its poetical side. It would little suit most romance readers, as the story is too wild to be interesting, and is merely a thread to connect the author's own thoughts and opinions. The conclusion of the work, as given by rough notes, was to have been eccentric even for a German enthusiast. Heinrich was to have come into a land where men, beasts, minerals, and even tones and colours held converse, where the world of tales (*Märchenwelt*) was to become visible, and the real world to be considered as a tale. It may be observed that Novalis regarded the *Mährchen*, or popular traditions, with singular respect, and discerned in them, or fancied he discerned, a deep meaning. He was accustomed, says his biographer, to regard the most ordinary occurrence as a miracle, and the supernatural as something ordinary.

In 1800 he was subject to spitting blood, and fell into a weak state. The books which he then constantly studied were the Bible, and the works of Zinzendorf and Lavater. He loved to talk of all his projected works, and professed

that he now for the first time knew what poesy was, and designed to re-write 'Ofterdingen.' On the 19th March, 1801, he died, in the presence of his friend Frederic Schlegel, before he had completed his 29th year.

Novalis is a writer who will either be read with some degree of enthusiasm or not read at all. Hence while almost idolised by the partisans of the romantic school, he is mentioned with a kind of benevolent contempt by the opponents of that school. His imagination and enthusiasm are most boundless: he darts from prodigy to prodigy with a celerity that cannot be followed, unless the reader allows himself to sympathise with the author. The effects of the ideal philosophy of Fichte, and the love of tales so predominant in the romantic school, are plainly discernible in Novalis's works. He had literally constructed an unreal world of his own, and seems to have breathed an atmosphere utterly unlike that of the actual world. A desire of combining religious fervency with philosophy is also apparent; and thus that combination of speculation and enthusiasm which is found in the writings of the Alexandrian Platonists and the Mystics was very acceptable to him. The 'Hymns to Night,' and the latter part of 'Ofterdingen,' are equally remarkable for the vast power manifested in the construction and the dimness of the construction itself, while here and there the acuteness of some remarks is not to be mistaken. The 'Pupils at Saïs' is another fragment of a romance, the object of which was to reveal Novalis's views of physical science, for which and mathematics he had a great taste. If however the works above mentioned are remarkable for singular combination, his spiritual songs ('*Geistliche Lieder*') are no less so for their perfect simplicity and pure spirit of devotion. They are indeed complete gems of religious poetry. The posthumous works of Novalis contain numerous aphorisms, which show the direction of his studies, a most remarkable turn of thought, and a love of startling paradox, combined with singular acuteness. The whole works of Novalis were collected and edited by his friends Tieck and F. Schlegel, with a biography prefixed by the former. The edition has been reprinted at Paris, in one vol. 8vo.

NOVA'RA, the Province of, in the Sardinian territories, is bounded on the north by the province of Pallanza, on the east by the river Ticino, which divides it from Austrian Lombardy, on the south by the province of Mortara, and on the west by the provinces of Vercelli and Val di Sesia. It is about 35 miles in length and 15 in breadth, and consists in a great measure of a plain between the rivers Sesia to the west and Ticino to the east, which is crossed in its length from north to south by the Agogna, likewise an affluent of the Po. The northern part of the province extends to the hills which border on the lakes Maggiore and Orta. The population is 134,000, distributed among 93 communes. (Serristori, *Saggio Statistico d'Italia*.) The country forms part of the plain of the Po, and is very productive, especially in corn, rice, wine, hemp, and silk. Abundance of poultry and pigs are reared.

The chief town, Novara, a bishop's see, is situated on a hill at the foot of which flows the Agogna; it is fortified, and the circumference of its ramparts is nearly two miles. Seen from a distance, the town with its numerous steeples appears more considerable than it really is. It is however a place of some importance, though old looking and irregularly built: it has many churches and convents, a gymnasium, a clerical seminary, two hospitals, a library in the Chapter-house, several palaces, especially that of the noble family Bellini, a handsome square, a theatre, and 15,300 inhabitants, including its communal territory; a considerable trade is carried on in silk and agricultural produce. The church of S. Gaudenzio contains several valuable paintings. Count Prina, minister of finance of the late kingdom of Italy under Napoleon, who was murdered by the mob at Milan in 1814, was a native of Novara. Luigi Bossi, the author of the only General History of Italy existing, in 19 volumes 8vo., and of several other works, was also a native of this province. The high road from Turin to Milan passes through Novara.

The other towns of the province are—1, Borgomanero, in the north part of the province, not far from the lakes Maggiore and Orta, a well-built bustling little town, with 6400 inhabitants; 2, Oleggio, near the right bank of the Ticino, with 6900 inhabitants; 3, Trecate, in the south part of the province, with 4200 inhabitants; 4, Camere, with 3400 inhabitants; 5, Orta, on the eastern shore of the lake of the



same name, with a sanctuary on the hills above, dedicated to St. Francis, is much frequented by the country-people around. The pretty lake of Orta, which is partly in the province of Novara, is ten miles in length from north to south, and little more than a mile in breadth. Its southern extremity is about 20 miles north of Novara. Its outlet is at the opposite or northern end, from which the waters flow into the Lago Maggiore, which is seven miles distant to the east. The banks of the lake of Orta are hilly and pleasant, and covered with villages, hamlets, and handsome country-houses. Many of the inhabitants of this district emigrate to foreign countries, and especially to Spain, whence some return with the savings of their industry. In the middle of the lake is the little island of S. Giulio, with a very handsome church, a palace belonging to the bishop of Novara, and some other buildings and gardens. This island was once fortified, and is mentioned in the wars of the middle ages.

The actual province of Novara is only a part of the former territorial division, called Il Novarese, which comprised the whole country between the Sesia, the Ticino, Lago Maggiore, and the Alps, including numerous alpine valleys. It was frequently a subject of contention in the Italian wars. It formerly belonged to the duchy of Milan; it was given up by Austria to the king of Sardinia by the peace of Vienna in 1735; was reunited by Bonaparte to the Milanese, and formed part of the kingdom of Italy; and was restored to the king of Sardinia in 1815. The upper part of this interesting region is known by the name of Valli di Novara.

NOVARA, VALLI DI, or ALTO NOVARESE, a geographical denomination which designates a large tract of country consisting of numerous valleys in the Lepontian Alps, which are formed by mountains extending from the sources of the Anza at the eastern foot of Mount Rosa to those of the Tosa or Toccia at the foot of Mount Gries, which belongs to the group of the St. Gothard. All the waters from these valleys flow into the Lago Maggiore. A considerable alpine stream, the Toccia or Tosa, flows through a long tortuous valley from north to south, about 45 miles in length to its estuary in the lake. The upper part of the valley of the Tosa is called Val Formazza, and is from 3000 to 4000 feet above the level of the sea. Lower down, the valley takes the name of Valle Antigorio, which extends as far south as the bridge of Crevola, at the opening of the transverse valley Di Vedro, through which the great Simplon road passes. South of Crevola the main valley assumes the name of Val d'Ossola or Oscella, which it retains as far as its opening upon the Lago Maggiore. Several lateral valleys, descending from the high Alps, open into the valley of the Tosa from the west, called respectively Val di Vedro, Val Bugnanco, Val Antrona, and others from the east, such as the Val Vigezza, which extends upwards to the ridge which divides the Sardinian territory from the Swiss canton of Ticino. A road leads from Domo d'Ossola to Locarno by the Val Vigezza; the highest pass of it, near Centovalli, is 3000 feet above the sea.

The whole of this alpine district, including the main valley of the Tosa, and the various lateral valleys which open into it, is now constituted into one administrative province of the Sardinian states, called Ossola, from the name of the chief town, Domo d'Ossola, which is well built and cheerfully situated in a broad part of the valley: it has about 1500 inhabitants. The traveller who comes from Switzerland by the Simplon finds at Domo d'Ossola the first appearance of an Italian country, Italian manners, and Italian sky. The province of Ossola contains 33,000 inhabitants, distributed among 64 communes. (Serristori.)

South of the province of Ossola is the province of Pallanza, which also forms part of the Valli di Novara, and consists of a fine strip of land along the western coast of the Lago Maggiore and of several valleys extending on both sides of the lower Tosa. The longest valley is that of the Anza, a mountain-stream which descends from Mount Rosa, and after an eastern course of nearly 30 miles enters the Tosa near Vogogna. The upper part of this valley, which is in some parts more than 4000 feet above the sea, is called Val Macugnaga; several mountain-passes, practicable only in summer, lead from it into the Valais. The inhabitants of Val Macugnaga speak a dialect of the Swiss German, and they seem to be of a race akin to that of the Valais. Their houses are built of wood, and their country is rugged and poor. The lower or eastern part of the valley of the

Anza, down to its confluence with the Tosa, is called Val Anzasca, and has quite a different appearance. The vine is cultivated here, and the hamlets are built after the Italian fashion. The women of the Val Anzasca are noted for their comeliness, and their refined appearance and manners, which are superior to those of their neighbours. Their dress is gay and fanciful, and recalls to mind that of the women of the Greek islands. The Val Stroma, south of the Val Anzasca, opens to the northern coast of the lake of Orta.

The principal towns of the province of Pallanza are—1. Pallanza, on the banks of the lake Maggiore, opposite the Borromean Islands, which has the Tribunale di Prefettura, or provincial court, a royal college, and about 2000 inhabitants. 2. Intra, north of Pallanza, which has 3300 inhabitants, and carries on some trade by boats on the lake. 3. Arona, with 2000 inhabitants. [ARONA.] The population of the province is 64,800, distributed among 98 communes.

NOVATIANS, a Christian sect which arose in the middle of the third century. Their leader Novatianus (or as Lardner prefers to call him, following the Greek writers, Novatus), was a presbyter at Rome, who, after the death of Fabian, bishop of Rome (A.D. 250), and the election of Cornelius as his successor (A.D. 251), refused to submit to the authority of Cornelius, and procured from three bishops his own ordination as bishop of Rome. Upon this Cornelius called a council at Rome, and excommunicated Novatian and his adherents, who immediately formed a distinct sect, and thus became schismatics. But Novatian is also reckoned as a heretic, on account of his opinions respecting those Christians who after baptism had fallen into open sin, whom he declared that the church had not the power to admit again to her communion, even though they should give satisfactory evidence of their repentance. In consequence of this strictness of discipline his followers obtained from the Greek writers the name of C  thari (*κα  τοι*), that is, Puritans. In other points the opinions of Novatian did not differ from those of the Catholics. Some writers charge him with unsound opinions respecting the Trinity, but there is ample evidence to disprove this accusation. His later followers condemned second marriages. Novatian is highly spoken of by the ecclesiastical writers for his learning, eloquence, piety, and exemplary conduct. It is true that Cornelius accuses him of very disreputable conduct in the means by which he obtained ordination, and in other matters; but these are the statements of a violent opponent, couched in very unmeasured language, and some of them are highly improbable.

Novatian was assisted in his proceedings by Novatus, a presbyter of Carthage, whom Cyprian calls the author of the schism; and he numbered also among his followers some bishops and several presbyters. His sect spread widely, and embraced at various times some men of very high character and attainments. The Novatians were included in the severe edict which Constantine issued, about A.D. 331, against the Valentinians, Marcionites, Cataphrygians, and other heretics; but it is thought that through the influence which some of their leaders had with the emperor, they suffered little on that occasion. Under the Arian emperors they shared in common with the orthodox in the persecutions which they endured; but under the Catholic emperors they appear to have enjoyed repose on account of their orthodox opinions on the Trinity. This sect declined in importance during the fifth century.

Novatian wrote several works, of which there remain a treatise, 'Of Jewish Meats'; another, 'Of the Trinity,' or 'Of the Rule of Faith'; a letter of the Roman clergy to Cyprian, written during the vacancy of the see of Rome, after the death of Fabian, in August, 250. There is another letter to Cyprian, written in the same year, but it is not certain that Novatian was its author. Jerome gives a catalogue of Novatian's works, among which are two, 'Of Easter,' and 'Of Circumcision.' The Novatians asserted that their leader suffered martyrdom, but of this we have no proof.

(Eusebius, *Hist. Ecc.*, vi. 43; Hieronymus, *De Vir. Illust.*, chap. 70; Epiphanius, *De H  resis*; Lardner's *Credibility*, pt. ii., chap. 47; Mosheim's *Ecclesiastical History*, Neander's *Kirchengeschichte*.)

NOVEL. It will be as well to draw a distinction at starting between romances and novels; the one term includes all fictitious narratives of the kind called romantic whether in prose or verse; the other is used to designate that species of romance which is most common at p-

Those who are accustomed to look upon all literary composition as depending for its changes on that prevalent tone and character of society, which are usually known by the name of the spirit of the age, will easily allow that imaginative writings are not excepted from the general rule; that they are in fact the expression of the age in which they appear. It remains then for us to find out, if possible, what relation they bear to that prevalent tone of society to which we have already alluded, as the spirit of the age.\*

A comparison between the novel and other imaginative compositions, such as narrative, lyrical, or dramatic poetry, will show that while the latter depend for their effect on our tastes and sympathies as men, the former requires us to be interested in the circumstances of the plot as well as in the characters themselves. The interest excited by the 'Iliad,' and by 'Hamlet,' exists independently of our knowledge of the history of Troy or of Denmark; and hence the universal celebrity of those poems. They have been read and will be read with delight, not only by one age or country, but by all. They exhibit pictures of *humanity*; and, as such, do not depend for their popularity on the fact of their readers being interested by the customs which they describe or the scenes in which the stories are laid. It is as a man, not as a prince of Denmark, that we are interested in Hamlet. If Hector and Andromache had been natives of the South Sea Islands, we should have read the description of their parting with as much sympathy as we do now.

In novels, on the contrary, we require, in order to be fully satisfied, to be interested in the circumstances, the dress, manners, and language of the characters, as well as in the characters themselves. But these circumstances, the outward dress of the story, are precisely those parts in which the peculiarities of age and country are developed—those which render the hero of the novel an individual, not the representative of a class. If we acknowledge thus far, we shall see that the interest which the novel excites depends on more causes than that of the narrative or dramatic poem. But being a more intense, it is also a more confined interest; and thus we see why the ponderous romances of the seventeenth century have ceased to delight the world, while the 'Iliad' is as fresh to us as it was to Plato or Cicero.

This additional source of interest however is that which depends in itself on the peculiarities of the age in which any one novel or class of novels appears. Thus the stilted romance of Elizabeth's time was the legitimate offspring of a taste then very prevalent for an ideal state of pastoral life called Arcadian. The readers in that day were the higher ranks, the court, and the nobility, and the novel both led and followed their taste. In another country we find romances of chivalry particularly current when the age of chivalry was nearly passed, and when the realities of Moorish warfare had been succeeded by a fashionable enthusiasm unaccompanied by action. Such were the novels which Cervantes began by caricaturing and ended by surpassing.

Sir Walter Scott's novels are in like manner the legitimate creation of their age. Percy's 'Reliques' and some other books had given a retrospective turn to literature. Men began to find that Pope and Dryden, or even Milton, did not contain all that was worth knowing in the literature of England. A race of antiquaries sprang up, and with them an antiquarian novelist. Göthe's famous saying about Shakspeare, which Carlyle has so cleverly applied to Scott,—'that Shakspeare formed his characters from within outwards, Scott from without inwards,' is so true, that any one who bears it in mind while reading Scott will not fail to see that the attraction of the 'Waverley novels' depends more on the dresses and decorations than on the actors.

To quote one more instance; during the first half of the last century the great object of attention was 'the town,' by which was meant the profligate life spent by men of fashion. A glance at the poetry of that age is enough to show that Nature had small charms for the reading public, and that fashion was then everything. If we turn to the novelists, to Richardson, Fielding, and Smollett, and then to their descriptions, can anything be more obvious, than that

the external dress of the novel—that by which it is distinguished from other narrative works of imagination,—depends entirely on the age in which it is written, and is in effect tolerably faithful but somewhat exaggerated reflection of the favourite ideal objects and pursuits of the reading classes at the time.

But there is another salient feature in the novel, which possesses in common with the poetical romance, and which distinguishes it most completely from all classical fictions. We refer to the important part played in almost all novels by that kind of love which goes by the name of *romantic*.

It cannot be doubted that the influence of Christianity and of the old German spirit upon the nations of modern Europe has contributed to alter the treatment and condition of women, not only in degree but in kind. To the eye of a Roman observer, one of the most remarkable peculiarities of the German nation was the veneration paid to women, and this veneration, transmitted through generations, affected in no unfavourable degree by Christian precepts, although changing in appearance with the change of ages, still exists in that gallantry of which the Romans and Greeks seem to have been wholly ignorant, and which is the romantic novel, as being a picture of human life, is a most important part. But it is still to be remembered that it is not the passion of love as a classical author would have described it, but the passion as developed in those times among whom romantic tales have been principally current, which thus predominates in the romantic novel.

The 'Bride of Lammermoor' is perhaps the most perfect instance of a love-tale which we possess, but that touching and exquisitely pathetic story would have been in most of its most striking features unintelligible to men who did not begin by assuming, as we all instinctively do, the existence of a feeling partly corporeal, partly mental, partly dependent on national custom, which goes with its by the name of love. The only parallel instances in the remains of classical literature are, as far as the writer knows, some scattered passages in the 'Odyssey,' and the characters of Haemon and Antigone as described by Sophocles. It is important to insist on this feature of the novel, because it at once gives a clue to the popularity of those numerous love-tales which in our times appear in such profusion, are read, and disappear, provided always that we connect this feature, which runs through them all, with the desire which all of us possess of giving to those dreams of domestic happiness—which are the offspring of feelings which we inherit both by nature and by education—as much of reality as is possible.

The popularity of novels is one of the most curious features of our literature; and it is to be observed that it is attended with an almost entire discouragement of dramatic composition, and with a marked preference on the part of those who apparently patronise the drama, for scenic effect, in place of accurate dramatic delineation of character. There is scarcely one tragedy worth mention of a date posterior to the time of Fielding. 'Philip van Artevelde,' the offspring of our day, and, although far below it in merit, Talfourd's 'Ion,' are worth notice, as well for other reasons as because they have been accompanied by an effort, in act, to redeem the stage from serving as the mere vehicle of dramatised novels. But we cannot give to 'Philip van Artevelde' the name of a drama; indeed the author himself styles it a dramatic romance; and its length and the character of many of its incidents bring it rather under the romance than the drama. We have drawn a distinction between the romance and the novel, the former being the more comprehensive word; but we must still bear in mind that a prose novel stands in the same relation to a later age than a poetical romance does to an earlier, for poetry constitutes the only possible literature of an age of reciters; and it is not until men begin to read for themselves that prose comes into being.

There is another feature about the novels of the present day which deserves especial notice, and that is the manifold forms which they assume. We have them as manifold tales, military records, love stories, political memoirs, the diaries of clergymen, lawyers, and physicians—suited in short to every class of readers. From this we see how much the demand influences the supply, even in that most incorporeal of all manufactures, book-making. That the appetite is fed by the supply is also true, but not to an extent sufficient to justify us in supposing that the one depends entirely upon the other. The manifold char-

\* Some ridicule has been cast on this expression, but apparently without much reason. The term is not used to express one simple notion, but as a means of indicating by a kind of verbal shorthand a number of notions which when expanded might fill volumes. Half the common theological forms in use are liable to the same objection (which is expressed by applying to them the name of 'cant'); but when all persons are to a certain extent agreed on what the words are to mean, it matters little what words we employ.

racter of modern romantic literature as compared with that uniformity which distinguished the romances of the middle ages, when author after author exhausted his powers in adding to one bulky record of the fall of Troy, or the conquests of Alexander, is the last proof which we need bring to show that romances do really depend upon and go along with the prevailing tone of the age in which they appear.

It is not the province of this work to enlarge on the probable or actual effects of any course of reading, but it may be as well to point out that the injury supposed to be done to the mind by novel reading is not peculiar to any one kind of study. A constant devotion to any abstract speculation notoriously deadens the taste; and too much cultivation of any one pursuit necessarily gives the corresponding part of the mind a growth disproportionate to that of the rest. The peculiar evil of novel-reading depends on the bad quality of the food devoured, which pampers our love for ideal griefs and joys, to the prejudice of all well organised efforts to grapple with the realities of life.\*

#### NOVELLÆ. [JUSTINIAN'S LEGISLATION.]

NOVEMBER, the eleventh month of the Julian year, was the ninth in the year of Romulus, whence it received its name. This name was assigned to it in the Alban calendar. It originally consisted of thirty days, which were continued by Romulus and Numa. Julius Cæsar gave it another day, but Augustus reduced it again to thirty, and this number it has ever since retained.

Our Saxon ancestors called November *Blot-monath* (blood-month), the month of sacrifice, because at this season the heathen Saxons made a provision for winter, and offered in sacrifice many of the animals which were then killed. This is distinctly stated in an antient account of the Saxon months, printed in Hickes's *Thesaurus* (vol. i., p. 219). It was common at this season to slaughter oxen, sheep, hogs, &c., for the use of the ensuing winter. The stock of salted meat prepared at this time was to last through the winter months till vegetation came again sufficiently forward to enable them to resume the use of fresh provisions. Some notion of the vast extent to which the opulent provided for themselves and their retainers at this season may be formed from the contents of the larder of the elder Spenser, in 1327, which, in the month of May, contained 'the carcasses of eighty salted beeves, five hundred bacons, and six hundred muttuns,' the reliques of his winter provisions.

Martlemass or Martinmas beef, cured about the festival of St. Martin, the 11th of this month, was a provision formerly well and in some places still known. The Spanish proverb, 'His Martinmas is coming, when we shall be all hogs alike,' alludes to the slaughter of swine at this period.

(Pitisci, *Lericon Antiq. Roman.*; Bosworth's *Anglo-Saxon Dict.*; Brady's *Clavis Calendaria*, 8vo., Lond., 1812, vol. i., p. 85-91.)

NOVI, The Province of, an administrative division of the Sardinian territories, which formerly belonged to the republic of Genoa, is situated on the north side of the Ligurian Apennines. The Lemmo and other mountain torrents which flow from the northern slope of the group of La Bocchetta cross the province of Novi from east to west, and flow into the Orba, which is an affluent of the Bormida. The Scrivia, a considerable stream, rises farther to the east, crosses the province of Novi in a northern direction, and then, passing by Tortona, enters the Po. The province of Novi lies chiefly among the Apennines, and is not very productive, except the most northern part, above the town of Novi, which opens into the plain of the Po, and is well cultivated, being planted with vines, mulberry, and other fruit-trees. The mountains supply pasture for cattle, and are partly covered with fine chestnut-trees. The population of the province is 57,500, distributed among 36 communes. The principal towns are the following:—Novi, a cheerful, well-built town, is situated in a plain at the foot of the Apennines, on the high-road from Genoa to Turin and Milan: the continual transit of goods and travellers gives it an appearance of bustle. Novi has several churches, a college kept by the Fathers Somaschi, and some handsome palaces belonging to the Genoese patricians, who come here to spend part of the autumn: the population is about 10,000. The Genoese style of painting the fronts of the houses with various colours is in use at Novi. Voltaggio, at the foot of La Bocchetta, on the old road to Genoa, is a

poor-looking place: it has a grammar-school and 2200 inhabitants. Serravalle, on the new and fine road by the banks of the Scrivia, had 2100 inhabitants in 1824; but the population has since increased, owing to the trade which now follows this line. Gavi is a small town with a strong castle, which commands the defile in the mountains through which the old road passed. Pozzuolo has 3000 inhabitants. Arquata has 2400 inhabitants. All these towns have communal or elementary schools.

It was in the neighbourhood of Novi that the French army, 40,000 strong, under Generals Joubert, Moreau, and St. Cyr, was attacked by the Austro-Russians under Suwarrow and Melas, on the 15th August, 1799, and completely defeated, after ten hours' continual fighting. It was one of the most obstinate and murderous battles of the wars of the French revolution. General Joubert was killed, and Generals Perignon and Grouchy were wounded and made prisoners. The French lost 10,000 men, killed, wounded, and prisoners. The Austro-Russians had about 12,000 men killed and wounded. Moreau withdrew the remains of the French army across the Apennines towards Genoa.

(Botta, *Storia d'Italia*, b. xvii.)

NOVICE, the appellation given to persons of either sex, who are living in a monastery in a state of probation previous to becoming professed members of a monastic order. Persons who apply to enter the noviciate state, on being admitted by the superior of the monastery, promise obedience to him during the time of their stay, and are bound to conform to the discipline of the house, but they make no permanent vows, and may leave, if they find that the monastic life does not suit them. The period of the noviciate must not be less than one year, and the person who enters as a novice must have attained the age of puberty. Richard, in the 'Bibliothèque Sacrée,' article 'Novice,' describes the qualities required according to the canons of the council of Trent for the admission of a novice: they are health, morality, voluntary disposition for a monastic life, intellectual capacity, &c. No married person can be admitted unless by the consent of both parties; no person who is encumbered with debts, or whose assistance is necessary for the support of his parents, is admissible. Widowers and widows may be admitted as novices, unless their labour is required for the support of their children. After the termination of the year of probation, the novice, if he (or she) persists in his vocation, and his conduct and capacity have proved satisfactory, may be admitted into the order by taking the solemn vows which are binding for life. Ducange, in his 'Glossarium,' article 'Novitius,' quotes the 34th canon of the council of Aquisgrana, A.D. 817, in which superiors of monasteries are cautioned against admitting novices with too great facility, and without a full examination of their disposition, morals, and mental and bodily qualifications. But in after-ages, as the number of monasteries was multiplied beyond measure, prudential restrictions were disregarded, and every means were resorted to in order to induce young people to enter the monastic profession, and parents often forced their children into it against their will. The misery and guilt which resulted from this practice are well known, but few perhaps have exhibited them in so vivid and fearful a light as a living Italian writer, Manzoni, in his 'Promessi Sposi,' in the episode of 'Gertrude.' It was in order to guard against such abuses and their fatal results, that the council of Trent, session 25, can. 17, prescribed that female novices, after the expiration of their novitiate, should leave the walls of the monastery and return to their friends, and be carefully examined by the bishop of the diocese, or by his vicar by him delegated, in order to ascertain that they were under no constraint or deception, that they were fully aware of the duties and privations of the monastic life, and that they voluntarily chose to enter it. These humane precautions however have been evaded in many instances; and it may be doubted whether a very young person should be allowed to bind himself for life by irrevocable vows.

NOVIKOV, NIKOLAI IVANOVITCH, born April 27th, 1744, at Tikhvensk, near Moscow, was, if not particularly eminent as a writer, one to whom Russian literature is greatly indebted, on account of what he did for the book-trade, and for printing, and for diffusing a taste for reading among his countrymen. Though his parents were wealthy, he did not receive the very best education, being brought up at home until the age of eighteen, when he entered the government service, and then first began to apply him-

\* For the distinction between a hearing and a reading age we are indebted to Mr. C. J. Vaughan's prize essay recited in Trinity College Chapel, Cambridge, December, 1937.



to study. Having thus conceived a passion for literary pursuits, he determined upon devoting himself to them exclusively, and accordingly he retired from the service. One of his first productions was his 'Zhivopisetz' (the Painter), a work somewhat on the plan of the 'Spectator,' and displaying considerable talent and satiric power in sketches of manners and characters; and which, although now become somewhat obsolete, still retains its popularity, and has been frequently reprinted; yet the later editions are not very correct. He shortly afterwards published his 'Opuit' (Specimen or Essay of a Lexicon of Russian Authors), which has preserved notices of many writers respecting whom little would otherwise now be known. These works procured him the notice of the empress Catherine, and he soon after settled at Moscow, where a wide field opened itself to him. With the consent of the government, he established in that capital a Typographical Society, having for its object the printing of useful books at a cheap rate, and diffusing them through the empire. He also set up the first circulating library; and did very much both to improve the character and increase the sale of journals and other periodicals. Neither was his attention confined to such improvements, for he helped to introduce many into the system of school-education. His activity and that of his associates was however looked upon with suspicion by many, and they were represented as favouring the principles of, if not themselves actually in league with, the philosophers and revolutionists of France. The consequence was that the society was broken up, and Novikov received a command to retire to a distant province. After the emperor Paul's accession he was permitted to return, but he from that time lived almost in retirement from the world, and devoted to mystic speculations, upon his estate at Tikhvensk, where he died, July 31 (Aug. 11), 1818.

Novikov has been compared to Franklin, and he was certainly a very active and useful person. He is said to have possessed in a very extraordinary degree the art not only of gaining over others to his schemes, but of rendering them as eager and zealous in them as himself. Hence, notwithstanding the vast sums which his speculations required, they never were hindered by want of funds, for rich merchants and wealthy proprietors were always pressingly ready to advance whatever might be necessary. He himself was equally disinterested, his object being not to enrich himself, but that his schemes should succeed for the benefit of the public; at all events, it is certain that he died poor.

Among his own publications, in addition to those already mentioned, was a collection of historical documents and materials, entitled the 'Old Russian Library,' 1773-5, in ten volumes, and afterwards continued to twenty more.

NOVOGOROD, one of the eight governments of Great Russia, derives its name from its capital, which was formerly the residence of the most powerful of the Russian grand-dukes, whose dominions included also the present governments of Olonez, Pskow, Twer, and part of that of St. Petersburg. The government in its present limits extends from 57° 18' to 61° 8' N. lat., and from 30° 10' to 39° 40' E. long. It is bounded on the north-west by the government of Petersburg, on the north by that of Olonez, on the east by Wologda, on the south-west by Jaroslaw and Twer, and on the south-west by Pskow. The area, according to Schubert, is 54,100 square miles, or about 4000 square miles less than that of England and Wales. It is divided into ten circles, and the population in 1838 was 950,000.

*Face of the Country; Soil; Climate.*—Part of this government is traversed by the Waldai hills, which run through this government and Twer, and are probably in no part more than 300 feet high. The face of the country is diversified with hills, rivers, high banks, plains, valleys, marshes, and lakes. The northern part is low and swampy, and for the most part covered only with peat. In the southern part the soil is clayey or sandy, and in some places there is a black mould. There are fine pastures, and the agricultural produce amply repays the labour of the husbandman.

The Waldai chain, so called from the town of Waldai, extends on the south-east part of the government to the frontier of Twer, forming a line of detached hills about 100 miles long, which are close to each other, and almost all of them cultivated. In the narrow intervening valleys there is a pleasing mixture of wood and water scenery. The principal rivers are the Msta, which comes from Twer, and the Wolchow. The Msta has some falls at Borowitschi, but is

navigable below them, and runs into Lake Ilmen. The Wolchow, which issues from Lake Ilmen, and flows into the Ladoga canal, is from 600 to 1200 feet in width, and has sufficient depth of water for barks during the whole summer. These two rivers, which are connected by Lake Ilmen, complete the great water-communication between the Wolga and the Neva. The other chief rivers are, the Lovat, the Putila and the Schelen, all of which fall into the Ilmen; the Selkona and the Wologa, which join the Wolga; and the Sura and the Buscha, which run into Lake Ladoga. The government contains 42 rivers, and 3 large and 53 small lakes. The Belosero, which is the largest, is above 26 miles in length and as many in breadth, and is connected by the Selkona with the Wolga. Lake Ilmen, which is 26 miles long and 16 wide, receives many large and small rivers; it is connected by the Wolchow with the Ladoga canal. The Wusch is 14 miles long and 8 wide. The Novogorod canal, which was completed in 1802, is a part of the great system of communication between the Neva and the Wolga. It is about 5 miles long, connects the Msta directly with the Wolga, and so avoids Lake Ilmen, the navigation of which is often dangerous on account of the frequent storms.

The climate is cold, and very much like that of the government of Petersburg, though the latter seems to be really rather milder than that of Novogorod, where the winter, in the northern circles at least, is colder, and lasts a fortnight sooner and lasts a fortnight longer than in the southern circles. This low temperature has an injurious effect on the growth of many vegetables, and on the domestic animals, for whose subsistence it is difficult to provide during the long winter; but it does not affect the health of the inhabitants.

*Natural Productions.*—Agriculture is the chief occupation of the inhabitants, though the climate in the northern circles is unfavourable, and the frequent and early night frosts often destroy all prospect of a good harvest. The inhabitants too are rather slovenly in their operations, and have no regular system of cultivation. They however produce more than they require for their own consumption. The chief agricultural products are rye, barley, oats, buckwheat, and great quantities of peas. Flax and hemp are cultivated, not only for home consumption, but for exportation. Turnips, cabbages, potatoes, onions, radishes and leeks are cultivated, as well as cucumbers and pumpkins; and in the southern circles, apples and cherries are raised and then grown. The country is covered with thick forests, but there are scarcely any oaks; the maple, the ash, and the willow are rare; the most common trees are pines, fir, birches, alders, elms, and much underwood. Timber is a great staple article of the government, but by no means turned to so good account as it might be; and many of the forests are inaccessible in summer on account of the swamps. The crown forests alone cover a fifth part of the whole surface. All the forests abound in berries of various kinds; they likewise contain game and beasts of prey, such as deer, elks, bears, wolves, lynxes, badgers, martens, hares, and squirrels. Owing to the length of the winter, the breeding of cattle is limited to what is necessary for the purposes of agriculture. The horses, oxen, and sheep are of the common Russian breeds; few swine and goats are kept. The fisheries on the lakes and rivers are extremely productive, and furnish an abundant supply both for home consumption and for exportation to Petersburg, Moscow, Twer, Pskow, and Jaroslaw: several of the small rivers produce pearls. The mineral products are iron, freestone, coals, slate, salt, clay, lime, and marl. The principal salt-springs are at Staraja-Russia, where from one to four millions of pounds of salt are annually made, which supply the provinces of Novogorod and Twer.

*Manufactures and Trade.*—There are no manufactures of any importance. In the towns there are some domestic manufactures, and in the country the people make coarse linen, soap, tallow candles, and great quantities of potash. They have likewise small furnaces in which they smelt the bog-iron found in the government, and manufacture it into small articles of iron-ware. There are some trifling distilleries. The export trade of the province is confined to its own productions, corn, hemp, flax, salt, some iron, a great quantity of timber, some furs, hides, leather, and forge. Most of which goes to Petersburg. The principal place of trade is Novogorod, the capital, the commerce of which however is not very great. Most of the goods are exported by the inhabitants themselves, who visit the commercial towns

d fairs to the distance of 60 or 70 miles, in caravans of 50 100 carts, or in sledges drawn by one horse. Great numbers of geese are sent from this government to Petersburg. The great majority of the inhabitants are Russians, with few families of Finns, and in the towns some Germans. The predominant religion is the Greek, under the bishop of Novgorod, one of the highest prelates in the empire, whose diocese includes also the government of Plesk. He generally resides in Petersburg, where he is metropolitan. Among the Finns there are many Lutherans and some Lutheran churches.

NOVGOROD (or *Novgorod*, or *Novgorod Welihe*, that is, the Great New City), the capital of the above government, is situated in 58° 32' N. lat. and in 31° 20' E. long., 20 miles south-south-east of St. Petersburg, in a fine country on the banks of the Wolchow, where it flows out of Lake Ilmen, and on the Novgorod Canal. The city consists of three parts: the fortress, standing on a steep hill on the north side of the river, surrounded with thick walls and towers; and on the south of the river the commercial town and the Sophienstadt (St. Sophia's Town), which are connected with the fortress by a handsome stone bridge. This city is one of the most ancient in the Russian empire, having been founded, according to Nestor, the historian, in the fifth century, about the same time as Kiev. In the ninth century it had its own prince, and Rurik made it the seat of government, but the court was soon afterwards removed to Kiev. Jaroslaw, his successor, gave the city considerable immunities in 1036. The governors however made themselves independent of the Russian grand-dukes. The citizens, having gradually acquired more extensive privileges, established a republic in the twelfth century, under a chief magistrate, whose office was hereditary, but whose power was limited. This new republic became very flourishing, and its territory is said to have extended to Livonia on the west and to Siberia on the east. In the thirteenth century the Hanseatic League established a factory here, which continued 200 years. Being most advantageously situated for trade, the town became extremely flourishing, and is said to have had in the fifteenth century 400,000 inhabitants, which gave rise to the saying, 'Who can resist God and the Great Novgorod?' The grand-dukes of Russia becoming jealous of its prosperity, Ivan Wassiliewitch I. completely reduced it under his power in 1477. It was governed with great severity, and a conspiracy against him having been formed in 1570, Ivan Wassiliewitch II. went thither in person, and caused many of the richest inhabitants to be executed. The government continued to treat the city with great rigour till the final blow was given to its prosperity by the foundation of St. Petersburg, which diverted the commerce of the Baltic into a new channel. Novgorod is now reduced to comparative insignificance. It consists principally of scattered groups of mean houses, separated by ruins or by fields formerly built upon, and its population does not exceed 10,000. Yet, when viewed from a distance, it has a very striking appearance, owing to its fine situation and the gilded domes of its sixty-three churches, which remain as monuments of its ancient splendour. The principal church is the cathedral, dedicated to St. Sophia, which stands in the fortress, and contains, among many other curiosities, the coffin of St. Ivan of Novgorod, to which numerous pilgrims resort, and the celebrated bronze doors, 11½ feet high and 3 feet wide, adorned with numerous figures and inscriptions, which are said to have been brought, in 988, by Wladimir the Great from Kherson, but which probably came from Germany. The other buildings are, three monasteries, of which that of St. Sergius is the principal, a fine bazaar, a new palace, a poor-house, and an orphan-school. There are several elementary schools and a Bible Society, a considerable sail-cloth manufactory, tanneries, and soap and candle manufactories.

Other towns in the government of Novgorod are—Staraja-Russa, on the Polista, with 5600 inhabitants, and considerable salt-works; Waldai, on the Waldai lake, with 3200 inhabitants; Tichwin, on the Tichwinke, with 4100 inhabitants; Kirdow, with 2500 inhabitants, remarkable for the new canal opened in 1827, which joins the Schekсна with the Suchona; Belosersk, on the Schekсна; Somina, on the river of the same name, with 5000 inhabitants: before the end of the fair at Nischnei-Novogorod this is a place of great animation, fifteen or twenty thousand persons being often assembled here; and Ustjushna, or Schelesopolskaja, in a country abounding in iron; the inhabitants, 2500

in number, have considerable trade in iron and timber. All the above towns are capitals of circles of the same name.

(Schubert; Hassel; Cannabich; Krusenstern.)

NOWANUGGER. [HINDUSTAN, p. 213.]

NOYON. [OISE.]

NUBIA, a general and rather vague denomination which is often used to designate a vast extent of country stretching along the banks of the Nile from the southern borders of Egypt to the frontiers of Abyssinia and Sennaar. The natives however apply the name of Noubas, or Wady el Noubas, to a comparatively small tract lying between Derr and the borders of Dongola; whilst in Egypt, the natives of the countries above the cataract of Assouan, as far as Dongola, are called by the general name of Berabera, and the name of Noubas is given to the black slaves brought from Sennaar and the countries south of it. (Burckhardt.) The ancient general name for the regions south of Egypt was Ethiopia above Egypt, of which the kingdom of Meroe formed an important part, and among the various people therein mentioned by the ancient geographers are the Nubæ, or Nubæi Ethiopes, who are placed south of the island of Meroe, whilst the Blemmyes were nearer to the borders of Egypt, west of the Nile, and the Troglodytes lived to the eastward, near the shores of the Red Sea. The extent of information possessed by the ancients concerning those regions, and especially concerning the kingdom of Meroe, is stated under ETHIOPIA.

The Nubæ, or Nubata, are mentioned as a nation bordering on Egypt in the time of Diocletian, who gave up to them a strip of land seven days' march in length, above the first cataract, on condition of their preventing the Ethiopians and Blemmyes from attacking Egypt. In subsequent centuries however a kingdom of the Noubas was formed, which is mentioned by the Arabian geographers as a powerful Christian country at the time of the invasion of Egypt by the Moslems. Dongola was the residence of the king of the Noubas. The country appears to have continued to profess Christianity, and to have retained its independence till the thirteenth century of our æra. Makrizi, an Arabian writer of the fourteenth century, quoting from his predecessor Ibn Selim el Assouany, who had visited the country, gives a good description of the kingdom of Nubia. He says that 'the Noubas and the Mokras were two different races, speaking two different languages, and both living on the Nile. The Noubas are the Merys, who border on the Moslem country, and speak the Merys language; that the ancestors of both the Noubas and Mokras were natives of Yemen, and that before the Christian creed, the two nations were Sabæans, adoring the stars, to which they had erected idols, and that they were often at war with each other, but afterwards they all became Christians, and the city of Dongola was the seat of their government.' (Extracts from Makrizi, in Appendix to Burckhardt's *Nubia*.) It is remarked by Burckhardt, that even now two different languages, both distinct from the Arabic, are spoken in Lower Nubia, namely, the Noubas and the Kenous, and that the name of Mokras still remains in the appellation of Wady Mokrat, which is three days' journey below Berber.

Soon after the invasion of Egypt by the generals of the caliph Omar, a Saracen army advanced to Dongola, and obliged Koleydozo, the king of the Noubas, to agree to pay an annual bakt, or tribute, of 360 head of slaves. This agreement was maintained with little interruption for more than five centuries, when, the Noubas having attacked and destroyed Assouan, Salah-ed-deen, the famous sultan of Egypt, sent an army against them and defeated them. In the following century Dhaher Baybar, the Mameluke sultan of Egypt, sent an army into the Noubas country, which took Dongola, ruined most of the churches, taking away the golden crosses and silver vessels, and carried away a vast number of captives. Daoud, or David, the king of the Noubas, who had provoked the war, fled, and his nephew Shekendi was made king in his stead by the Egyptian force. Shekendi agreed to pay an annual tribute of three elephants, three giraffes, one hundred camels, four hundred choice cows, and four hundred slaves. Besides this, the territory of the cataracts (probably that between the first and second cataracts), about one-fourth part of Noubas, was to belong to the sultan, and the people were to pay a capitation tax as long as they remained Christians. This convention however was not long respected, for Shekendi being driven away from the throne by a usurper, Samamoun, Sultan Seyfeddyn, Baybar's succe-

large force into the Nouba country, which defeated Samamoun near Dongola, and overran the country beyond that town for fifteen days' journey. The kingdom of Nouba was then given to a cousin of Samamoun, and the army returned to Egypt, carrying with them great numbers of Nouba captives, men and women, whom they sold at Cairo. Soon after the departure of the army, Samamoun recovered his kingdom, and the rival king took refuge in Egypt. The sultan of Egypt then sent an army of 40,000 men to recover the Nouba country, accompanied by 500 vessels of all sorts to ascend the Nile. The soldiers plundered and destroyed everything on their way until they reached Dongola, which they found deserted by the inhabitants. Samamoun escaped up the river, and being pursued by the Egyptians fifteen days' journey above Dongola, he fled to Aboab, in the territory of the king of Aloa, another Christian state, said to be more powerful than that of Nouba. His officers, bishops, and priests abandoned him, and obtained a safe conduct from the commander of the Moslems. The army then returned to Dongola, where a great feast was made and a banquet spread in the church of Ysous (Jesus), the principal church in Dongola. A nephew of old King Daoud was then crowned, and a body of troops left for his defence. The payment of the bakt, or tribute, was resumed, and after an absence of six months the army returned to Assouan, with great booty. No sooner had they left Nouba, than Samamoun returned in disguise to Dongola, and knocked at the door of all his officers, who, when they came out and saw him, kissed the ground in sign of allegiance. On the next morning he assembled the army and proceeded to the mansion of the new king, sent the Moslem guard back to Egypt, and seizing his rival, dressed him in an ox-skin and tied him to a post, where he was left till he died. Samamoun then wrote to the sultan of Egypt, asking his pardon, and promising to forward the bakt regularly, and in the meantime sent slaves and other presents, which were accepted. (Extract from Makrizi's 'History of the Sultans of Egypt,' in the Appendix of Burckhardt's *Nubia*.)

These events happened in the early part of the fourteenth century. After that time little is known of the history of Nubia, but it seems that the power of the kings of Dongola being broken, the country became divided into various petty states, while fresh immigrations of Bedouin Arabs took place, and Christianity became gradually extinct in all the countries between Egypt and Abyssinia. The remains of numerous Christian chapels are still seen along the banks of the Nile. The Mamelukes, and after them the Ottomans, retained possession of Lower Nubia as far as the second cataract, keeping garrisons at Ibrim, the island of Say, and Suakim. The old kingdom of Nubia ceased to exist, and instead of it rose various petty Mohammedan states, such as Sukkot, Mahass, Dongola, Berber, and others, each governed by a Melek, or chief. The name of Nouba however has remained to the tract of country north of Dongola as far as Seboua, from which place the remaining tract down to Assouan is occupied by the tribe of Kenous. Both the Noubas and Kenous derive their origin from Arabian Bedouins, who immigrated at various times and mixed with the aboriginal Christian inhabitants, who embraced their faith, while the conquerors adopted the language of the country, and to this day the Kenous and Nubian languages are spoken in all Lower Nubia, to the exclusion of Arabic, which appears again as the oral language in Dongola, from whence it continues all the way up to Sennaar. Burckhardt gives short vocabularies of the Nouba and Kensi or Kenous languages, between which there appears to be some etymological affinity.

The Noubas and Kenous are black or nearly so, but have not the negro features nor woolly hair. Many of them have the peculiar style of countenance which is often seen in the sculptures of the Egyptian temples.

The appearance of part of the country of Lower Nubia is described under BATN EL HAJAR. The districts of Sukkot and Dar el Mahass, which lie farther south, are more favoured by nature. The inhabitants of Mahass speak the Nouba language, but appear to be a distinct race from the Noubas; their countenances are much less expressive of good nature; in colour they are quite black; their lips are like those of the negro, but not the nose or cheek bones; they pretend to be descendants of the Koreysh Arabs.

The conquests of Mehemet Ali, pasha of Egypt, have of late years opened to the researches of travellers the coun-

tries of the Upper Nile, which had for ages been inaccessible to Europeans. In October, 1820, a force of about 4000 men, with ten field-pieces, assembled at Wady Halfa on the second cataract, under the command of Ismael Pasha, son of Mehemet Ali. They were accompanied by boats of various sizes for the purpose of ascending the river. They proceeded to Dongola without opposition. [DONGOLA.] The remnants of the Mamelukes, who had retired there some years before, fled to Shendy. But the country lying next above Dongola, along the great bend of the Nile, was occupied by the Sheygeia, a daring independent tribe of Arabs, possessed of an excellent breed of horses, and who lived a predatory life, and had become the terror of all the countries between the second cataract and Sennaar. They always fought on horseback, with lance, broad-sword, and shield. They had built strong castles on the hills, where they secured themselves and their booty, and obliged the native peasantry to work the fields for them, to raise food and forage to fill their stores. In short the Sheygeia exercised in the regions of the Upper Nile the same power as the Mamelukes formerly did in Egypt. The country of the Sheygeia is populous and one of the best cultivated in Upper Nubia, being irrigated by means of numerous water-wheels. The Sheygeia speak Arabic exclusively, and many of them read and write it. They have schools, and their learned men enjoy great consideration. Like other genuine Arab tribes, they strictly respect the duties of hospitality. These were the first enemies whom Ismael Pasha was to encounter on his march. They had already fought against the Mamelukes of Dongola with success. Hearing of Ismael's advance, they sent messengers to ask 'why he menaced them with war.' The pasha replied: 'Because you are robbers who live by disturbing and pillaging all the countries around your own;' to which they retorted, 'that they had no other means of living.' 'Why don't you cultivate your land,' said then Ismael, 'and live honestly?' They answered, with great frankness: 'We have been bred up to live and prosper by what you call robbery; we will not work, nor change our manner of living.' 'I will make you change it,' said the pasha. (*Narrative of an Expedition to Dongola and Sennaar*, by an American.)

In the first encounter the Sheygeia charged the advanced-guard of the pasha with great courage, but they could not withstand the regular fire of the carabines of the Osmanlees, and they dispersed themselves. They soon however made another stand in greater numbers, but the pasha having ordered up his guns, they were again defeated with great slaughter, and most of them fled across the desert to Shendy, leaving the country formerly subject to them in the hands of the conqueror. Contrary to former Turkish practice, Ismael protected their women and children from ill usage. Their chiefs afterwards demanded and obtained pardon, and some of them followed the pasha to Sennaar, and proved most useful auxiliaries. The conquests of the Sheygeia country disclosed for the first time to the eyes of strangers the temples and pyramids of Mount Barkal and Napata, the finest monuments of Upper Nubia. [BARKAL.] From thence Ismael proceeded to Berber, which country made its submission, and there the army rested for two months. A description of the country of Berber, one of the finest on the Upper Nile, is given under BARABRA. At Berber the pasha received the submission of some of the Mameluke beys, who had fled to Shendy, and he gave them assurance of living in peace in Egypt for the rest of their lives. He also received the forced submission of Nimir, malek of Shendy, who came in person to kiss the hand of the conqueror. The army continued its march southwards, and after eight days' march from Berber, following the west bank of the Nile, arrived at Shendy on the 9th of May, 1821.

Shendy is the principal place in the country of Athara, the antient island of Meroe, so called because it is in a manner enclosed between the Nile on the west, the Athara or Tacaze on the north and east, and the Dandar, Rahat, and other streams coming from the mountains of Abyssinia on the south. The interior of this vast country is little known; it is nominally divided between the states of Shendy and Halfay, which is to the south of the former, the two maleks or chiefs of which are said to be able to bring into the field thirty thousand well mounted horsemen. 'Our route from Berber,' says the American writer already quoted, who accompanied Ismael, 'led through a country consisting of immense plains of fertile soil, extending many miles from the

river, and mostly covered with herbage; few mountains or hills were visible. We passed many large villages built at a distance from the river to be out of the reach of the inundation. The houses were generally built with sloping roofs of thatched straw, as the country is here subject to periodical rains. Cailliaud, who accompanied the same expedition, observes that the periodical rains extend to the northward to between  $17^{\circ}$  and  $17^{\circ} 30'$  N. lat.; and it is remarkable that Strabo says that Meroe, the present Shendy, which is about  $17^{\circ}$  N. lat., was the limits of the rains. The rains extend to Berber, where they last three months, beginning about March. North of that, between Berber and Assouan, there is no fixed rainy season, but heavy showers fall now and then in all seasons. The bed of the Nile in Shendy is frequently about a mile and a half broad, though the actual stream is much narrower and shallow in the dry season. The country produces dourra, some wheat, vegetables, chick peas, and other pulse. The cattle are remarkably fine. The strip of cultivable soil near Shendy is very narrow, but to the north and south of the town there are some fine arable plains. Water-wheels are common on those high banks which the inundations do not attain, but the Arab peasantry are too lazy to bestow the labour necessary to water the soil a second and third time, as is done in the elevated parts of Upper Egypt. Elephants are first seen at Abou Heraze, in the southern parts of Meroe, on the borders of Sennaar, and they have never been known to pass to the north of that district, which is bounded by a mountain-range six or eight hours in breadth, reaching close to the Nile. Burckhardt was told that tigers were frequently seen in the wadis east of Shendy, towards the banks of the Atbara, or Tacazze. In the mountains of Dender, a district towards the Atbara, six or eight days' journey south-east of the Shendy, the giraffe (*zerafa*, i.e. 'the elegant,' in Arabic) is found. Crocodiles are very numerous in the Nile about Shendy, and much dreaded; but the hippopotamus is rarely seen. (Burckhardt.)

The town of Shendy, the capital of the country, about half a mile from the east bank of the river, is large, and perhaps contains five or six thousand inhabitants; the streets are wide and airy; the houses are low, but well built of clay; there are regular market-places, where, besides meat, fowls, liquid butter, grain, and vegetables, spices from Jidda, gum Arabic, beads and other ornaments for the women are sold. Great numbers of slaves from Abyssinia, Sennaar, and Darfur are purchased at a moderate price; a handsome Abyssinian girl sells for 40 or 50 dollars.

There is another town on the opposite or western bank of the Nile, called Shendy el Gharb (Shendy on the west), which is also large and well built, and contains about six thousand inhabitants. It has three market-places, where the people of the country exchange dourra and dollars for other provisions and goods. The people of Shendy have a bad character; they are said to be fraudulent, debauched, and treacherous.

Many Arab tribes inhabit the territory of Shendy, the great part of whom still lead the Bedouin life. The merchants of the town, and especially the brokers, are mostly foreign settlers from Dongola, Sennaar, Darfur, and Kordofan. A succession of Arab meleks, or kings, of whom Cailliaud gives the series, had ruled Shendy for nearly two centuries and a half. The habits of the people are nearly the same as at Berber, but there is more wealth, in consequence of the great trade, and more well-dressed persons are seen than in the latter country.

Not far from eastern Shendy, to the northwards near a village called Assour, or Hatchour, are a number of tarabys, or pyramids, the largest of which is about sixty feet high. Small sanctuaries with sculptures are attached to them, as to those near Mount Barkal. There are also extensive fragments of walls, columns, square pillars, and the remains of a small temple sixty feet in length, near the borders of the desert, and those of a larger one, with its propylæum. At another place called Naga, a little above Shendy, on the river side, are the remains of a Typhonium and other ruins; and farther south, at some distance from the Nile, are the remains of other temples, and of an avenue of sphinxes, and several sculptures executed in a rude and heavy style.

About twelve miles nearly due north of Naga, in a valley bordering on the desert, are the ruins of El Meçaurat, which consist of several temples of small dimensions, connected by galleries and terraces, with a number of small chambers,

the whole surrounded by a double enclosure. It has been supposed that this retired spot may have been the Hieropolis, or sacred college, of the priests of Meroe, and that the city itself was near Assour. (Cailliaud, *Voyage à Meroe*.)

Halfay, which lies south of Shendy, and between it and Sennaar, is a less important state. Its melek submitted to Ismael Pasha like the others. The head town, of the same name, lies above the confluence of the White and Blue rivers, and on the east bank of the latter, in about  $15^{\circ} 40'$  N. lat. Halfay was formerly subject to the king of Sennaar, from which it is separated by the Blue River, which is the utmost limits that can be assigned to the geographical denomination of 'Nubia.' The country beyond it is described under SENNAAR.

The monuments of Lower Nubia have been described by Gau, Burckhardt, Belzoni, and others. The most remarkable are the temples of Abousambul [ABOUSAMBUL], Dandour, and Soleb; though the last, lying above the second cataract, is considered by some writers as in Upper Nubia. A short account of these temples is given in the *British Museum*, 'Egyptian Antiquities,' published by the Society for the Diffusion of Useful Knowledge, vol. i., chaps. 7 and 8. The monuments of Upper Nubia and of Meroe have been described by Waddington, Cailliaud, and Rüppel.

The whole country, up to Sennaar and Kordofan, is now open to the investigation of European travellers, being under obedience to the Pasha of Egypt. It may be not amiss to state that the young and enterprising Ismael, who achieved the subjugation of these vast and almost unknown regions, and who carried his arms beyond Sennaar as far as  $10^{\circ}$  N. lat., met with a tragical death from treachery on his return towards Egypt in the summer of 1823. Passing through Shendy, he had the imprudence to retire with a few attendants to some distance from his camp, to enjoy, it is said, a nocturnal banquet. Malek Nimir, who was watching for an opportunity of revenge, set fire to the hut where the pasha feasted or reposed, and to the shrubs and dourra which surrounded it, and the young conqueror perished in the flames. His mutilated remains were found by the soldiers, and brought back to Cairo. His attendants were massacred by the natives, and the Greek physician to the army was first tortured by having all his teeth extracted. This man had rendered himself odious by several acts of cruelty, which Cailliaud mentions. Ismael was hardly four-and-twenty years old at the time of his death. Melek Nimir, with his accomplices, fled into Darfur.

NUCI/FRAGA. [NUTCRACKER.]

NUCLEOBRANCHIATA, M. de Blainville's name for his fifth order of his second section of his second subclass (*Paracephalophora Monoica*).

M. Rang, who has illustrated the anatomy of some of the families, makes the *Nucleobranchiata*, in his arrangement, the first order of Cuvier's class *Gasteropoda*, and comprises under it some of the *Heteropoda* of Lamarck and the family *Pterotracheæ* of De Férussac.

The following character of the order is given by M. Rang:—

*Animal* furnished with a foot compressed into the form of a fin, with an acetabulum or sucker (ventouse) on its superior border. Branchia pectinated. Both sexes comprised in the same individual.\*

Often a *shell*, which is spiral, has a very large aperture, and is vitreous and very fragile.

An *operculum* sometimes.

M. Rang observes that the Mollusks which he had already, in an anatomical memoir on the genus *Atlanta*, proposed to assemble under the name of *Nucleobranchiata*, borrowed from M. de Blainville, are all pelagic animals which are often met with on the surface of the sea in calm weather, swimming in an inverted position by the aid of their foot, which is compressed into a fin. They never creep, but they have the power of fixing themselves (to floating bodies only) by spreading upon them the sucker of their ventral fin, and at the same moment making a vacuum. The shells are very much sought after in collections on account of their extreme rarity.

Two families, according to M. Rang's arrangement, constitute the order *Nucleobranchiata*.

\*-N.B. M. Verany, in his description of *Caridæa*, says, 'Sexes séparés comme dans les Firoles; les mâles ont les organes sex. et placés antérieurement dans le côté gauche sous la baignoire dorsale, les femelles l'ont près de l'aune.'

1.  
*Firolidae* (*Pterotracheæ*, Fér.; *Nectopoda*, Blainv.; *Urobranchia*, Latr.).

*Animal* elongated, straight, and horizontal; one or more fins; branchiæ forming, with the other viscera, a nucleus on the dorsal part.

*Shell* sometimes present, and, when it is, incapable of containing more than a very small part of the animal.

*Genera.* *Firola* (*Pterotrachea*, Forsk.; *Firoloides* and *Sagittella*, Les.).

*Generic Character.*—Animal very much elongated, gelatinous and transparent, terminated behind by a tail more or less long and pointed; mouth situated at the extremity of a proboscis, and including an apparatus proper for mastication? No tentacles, or only two tentacular rudiments carrying the eyes at their external base; one or more fins; nucleus exposed, protected only by a membrane, and always situated below and behind the ventral fin; termination of the intestinal canal and of the organs of generation in a tubercle on the right side.

No shell. (Rang.)

The author whose characters we have above given remarks that the *Firolæ* are very common animals in the seas of the warm and temperate zones, and are remarkable for their extreme transparency, which is often interrupted by golden spots. Lesueur, to whom we owe information regarding their anatomy, mentions several species, perhaps too indistinctly defined. He also divided the *Firolæ* into three genera, viz. the true *Firolæ*, the *Firoloides*, and the *Sagittellæ*; but the generic distinctions upon which they rest appearing to M. Rang to be insufficient even for the establishment of subgenera, the last-named zoologist does not adopt them, and he thinks that perhaps the genus *Hyptera* of M. Rafinesque ought to be included in the genus comprehending the *Firolæ*, observing however, at the same time, that details on this subject are wanting. The species indeed, he adds, are sometimes very difficult to be determined, in consequence of the mutilations to which they are subject; and it is for this reason that great circumspection should be employed in establishing new species.



*Firola Frederici.*

*Carinaria.* (See the article.)

M. Rang remarks that the mollusks which form this genus are beautiful animals, transparent as crystal, and adorned with vivid colours. They are only found on the surface of the sea in calm weather, and are most frequently mutilated in some part or other, especially in the nucleus, which makes their shells comparatively rare in collections. M. Rang states that there are four well characterised species, *Carinaria vitrea* (the most rare, and the animal belonging to which has not yet been made known), *C. fragilis*, *C. Mediterranea*, and *C. depressa*; this last, which is comparatively new, was discovered by M. Rang in the seas of Madagascar.

M. Rang's experience is, that he can offer as a constant character the presence of asperities on the mantle of these mollusks, because he has observed them upon four very distinct species (*Carinariæ Mediterranea* and *depressa*, and two other species which he has not been able to make known on account of their mutilation), whilst he never met with such asperities in the *Firolæ*, in which, instead of asperities, there are numerous spots. The difficulty, he remarks, of distinguishing mutilated *Firolæ* and *Carinariæ* at sea, obliges the observer to neglect no character which may lead to a more easy determination, and that is the reason why he calls attention to the position of the branchial comb as a probable character, which has always appeared to him to be placed before the nucleus in the *Carinariæ*, and behind it in the *Firolæ*. The position of the nucleus with reference to the ventral fin may also, in his opinion, afford a good generic character.

\* \* In the cut taken from M. Verany's figure of *Carinaria*, vol. vi., p. 294, the letter *e*, indicating the line which points out the tentaculum, has dropped out.

Atlanta. (Lesueur.)

The reader will find a short account of this form under the article headed by its name; but the description of M. Rang, who has published an anatomical memoir on this curious genus, will be a valuable addition.

*Animal.*—Body compressed laterally, spiral, with a large foliaceous fin, furnished with a sucker at its posterior border; head in the form of a long proboscis; two cylindrical tentacles in front of two large eyes, which are pediculated, as it were, at their base; mouth at the extremity of the proboscis; male organs of generation at the right side, implanted at the base of a very large tube, which terminates forward by the orifice of the anus; branchiæ in form of a comb, on the *plafond* of the pulmonary cavity.

*Shell* rolled up longitudinally, very delicate, diaphanous, strongly carinated, with the aperture notched or slit anteriorly, and with a sharp edge; spire terminated by a *bouton*, at the bottom of the umbilicus, on the right side.

*Operculum* vitreous, delicate, fragile, bearing the muscular impression in its centre.

Two species only are known, natives of all warm seas.

NU'CLEUS is a botanical term strictly signifying the central succulent part of an ovule, in which the embryo plant is generated. It has also been applied to the point, or circle, visible on the side of a cell of cellular tissue, from which the cell itself is supposed to have developed, and which has recently been named cytoblast.

NU'CLEUS (a small nut), a term first given to the central and condensed portion of a comet, and thence to the central part of any appearance which is transparent towards the extremities and opaque towards the centre.

NU'CULA. [POLYDONTA.]

NUDIBRANCHIATA, Cuvier's name for his second order of *Gasteropoda*, which he characterises as having no shell nor any pulmonary cavity, but naked branchiæ on some part of the back. They are all hermaphrodite and marine; often swim in an inverted position, with the foot at the surface concave, like a boat, aiding themselves with their mantle and tentacula as oars. M. Rang gives the following definition of the order, which he makes to consist of the following groups—*Tritomans* of Lamarck, *Polybranchiata* and *Cyclobranchiata* of De Blainville.

*Animal* furnished with a foot for creeping, and naked branchiæ on some part of the back, which are always symmetrical, whether they are found on the median line or occupy the sides of it; one or more pair of tentacles; both sexes in the same individual.

*Shell* null.

The last-named author also describes the order as consisting entirely of marine and hermaphroditic animals, some of them inhabiting the banks and creeping by means of their considerably sized foot, and others the deep sea, where they attach themselves to fuci by a narrow and elongated foot, or swim in the manner described by Cuvier.

We proceed to give some account of the families arranged under this order by M. Rang.

*Pterosomatidæ.*

M. Rang thus characterises his *Pterosomes*:—*Animal* very much flattened, furnished with a horizontal natatory membrane all round the body; no tentacles; branchiæ?

This family is established provisionally on a mollusk very incompletely known, on which M. Lesson founded his genus *Pterosoma*. M. Rang is of opinion that it seems intermediate between the *Nucleobranchiata* and the *Nudibranchiata*, and that it can hardly be referred to either of these orders.

*Generic Character.*—*Animal* pelagic, gelatinous, transparent, elongated, cylindrical, convex in the middle, surrounded by two natatory membranes, which are delicate, horizontal, originating at the tail, and continuing, in an oval form, beyond the head, where they unite in front of the mouth; anterior border thicker, and, as it were, truncated; posterior border narrowed and more delicate; mouth terminal, without a proboscis; eyes sessile, oblong, approximated; tail cylindrical and pointed; digestive organs appearing through the substance of the animal; branchiæ, anus, and organs of generation unknown.

This mollusk was discovered by M. Lesson in the equatorial seas, between the Moluccas and New Guinea, where it appeared abundant. It uses the membrane with which it is surrounded as a locomotive organ, and swims with great vivacity horizontally.





Pterosoma.

Glaucidæ. (*Tritoniens*, Lam.; *Tétracères*, Blainv.; *Phyllobranchies*, Latr.)

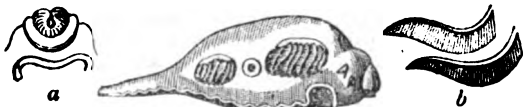
Animal furnished with two pair of tentacula, and sometimes three; branchiæ in form of strips or cirrhi.

Genera. *Glaucus*. (See the article.)

*Laniogerus*. (Blainv.)

**Generic Character.**—Animal with the body of nearly the same form as that of the *Glauci*, thick, and larger anteriorly, narrow and more delicate posteriorly, a gastropod, provided on each side with a series of soft laminæ finely pectinated, divided into two parts; mouth and tentacles as in *Glaucus*, as well as the termination of the digestive apparatus and that of generation.

M. Rang remarks that M. de Blainville established this genus on an individual in the British Museum, *Laniogerus Elfortii*; and the former remarks that the figure given by M. de Blainville recalls the appearance of those *Glauci* which M. Rang had preserved in spirit of wine, and which, having become more swollen, as always happens to them after death, have at the same time lost some of their branchial cirrhi.



*Laniogerus Elfortii*. (De Blainv.)

a, the mouth; b, the branchial cirrhi.

*Briaræa*. (Quoy and Gaim.)

**Generic Character.**—Animal pelagic, gelatinous, transparent, scolopendriiform, flattened, with two eyes? which are sessile, and four short tentacula, which are large and triangular, the posterior carrying at their extremity two sorts of very long filiform, elastic, and resisting antennæ; terminated behind by a tail; branchiæ disposed on each side and represented by flattened laminæ, bifurcated at their extremity, and decreasing in their length from the head to the tail, where they insensibly disappear; termination of the intestinal canal and of the organs of generation unknown.

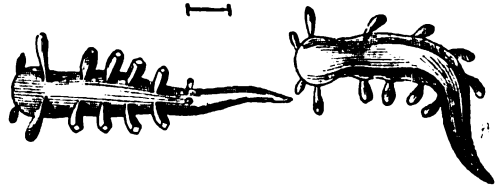
M. Rang observes that the discovery of the genus *Briaræa* is certainly one of the most interesting of those of MM. Quoy and Gaimard. Though completely unknown, there is, he remarks, no doubt as to the place which this mollusk should occupy; for if its characters were insufficient for that conclusion, we should be led thereto by the circular form which it takes in its state of suffering, and which recalls so well the genus *Glaucus* to those who have observed it alive. The only species known is *Briaræa Scolopendra*, found in the Straits of Gibraltar.

P. C., No. 1022.

*Eolidia*. (Cuv.) (See the article.)

*Tergipes*. (Cuv., Blainv. *Æolis*, Ok.)

**Generic Character.**—Animal limaciform, gelatinous; head tolerably distinct and furnished with two pair of tentacula; foot entire, and occupying nearly its whole length; branchiæ in form of small clubs (massues), not numerous, disposed in two rows, one on each side of the back; termination of the intestinal canal and of the organs of generation as in the *Eolidiæ*?



*Tergipes lacinulatus*.

M. Rang is of opinion that this genus is closely approximated to the *Eolidiæ*, with which, perhaps, it would be united if it was better known. Cuvier, indeed, observes M. Rang, states that each branchial organ of *Tergipes* is terminated by a small sucker, so as to serve them for a foot to creep on the back; but M. Rang thinks that this singular organization requires to be confirmed by observation on the living animal.

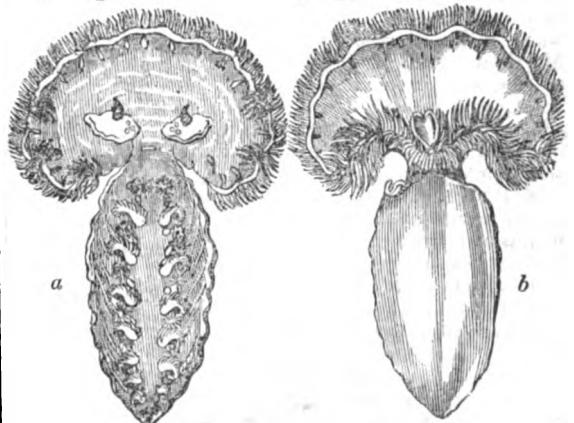
*Tritonidæ*. (*Tritomens*, Lam.; *Dicères*, Blainv.; *Scribranchies*, Lat.)

Animal with two superior tentacles, which are capable of being retracted into a kind of sheath at their base; a membranous veil more or less extended above the mouth; organs of generation and anus distant, on the right side; organs of respiration of various forms, but disposed on two longitudinal rows.

*Tethys*. (Linn.)

**Generic Character.**—Animal pelagic, gelatinous, and transparent; head distinct, and comprising a large membranous fringed veil, forming the funnel, shortened below, and from whose middle a small proboscis, terminated by the mouth, elevates itself: the tentacles, two in number, situated at the base of the veil, compressed, open at their summit to give passage to a small conical and retractile tube; foot very large; branchiæ formed by two longitudinal series of branched tufts, unequal alternately from right to left, and from front to rear; organs of generation united on the anterior portion of the right side; orifice of the anus placed more backwards.

Cuvier has thrown great light on this remarkable genus. The principal, and indeed, if we mistake not, the only recorded species, is a native of the Mediterranean, and lives far from the shore on banks of madreporæ or on floating fuci, using its veil as a natatory organ.



*Tethys leporina*.

a, seen from above; b, seen from below.

*Melibe*. (Rang.)

Animal pelagic, gelatinous, transparent, and limaciform; head distinct, and comprising a membranous veil rolled into the form of a funnel, furnished internally with cirrhi, directed to the exterior, and from the middle of which a small

proboscis, terminated by the mouth, elevates itself; tentacles, to the number of two, situated at the base of the veil, very elongated, conical, and terminated by a small capsule, from which a conical and retractile organ has egress; foot as long as the animal, but very narrow, in form of a furrow; branchiæ not numerous, formed of two series of oblong club-shaped processes (massues), which are rounded at their summit, pediculated at their base, and covered with small tubercles; organs of generation united on the anterior portion of the right side; anus more backward. (Rang.)

M. Rang is of opinion that *Melibe* is doubtless very closely approximated to *Tethys*, with which he had confounded it; but subsequent observation made on the living animal has led him to the conclusion that there is a generic difference, founded on the entirely different organization of the branchiæ.

The animal, which swims very well by agitating the posterior parts of its body from side to side, lives upon the floating plants of the seas near the Cape of Good Hope, where M. Rang observed it alive for some time. The branchiæ fell on a slight touch. The species which serves for the type of the genus is *Melibe rosea*.



*Melibe rosea*.

b, veil which surrounds the mouth; e, tentacles; g, branchial club-like processes; h, orifices of the organs of generation; i, orifice of the anus; f, foot; s, caudal extremity.

M. Rang remarks that certain little animals found by M. Dorbigny on the coast of Rochelle, and which present as respiratory organs small club-like processes, disposed in two longitudinal and dorsal rows, may, perhaps, be added to this genus.

#### Scyllæa. (Lin.)

**Generic Character.**—Animal pelagic, gelatinous, very much compressed laterally; the head not very distinct, and of a horseshoe shape; two great tentacles in form of reversed horns (cornets), flattened, slit anteriorly, and open at the summit for giving passage to a small-pointed and retractile body; mouth at the extremity of a very small proboscis, armed with an apparatus proper for mastication; foot long and very narrow, in form of a furrow; branchiæ in form of small tufted pencils, scattered over the internal surfaces of many equal appendages (appendices pairs) of the skin, and on a caudal and median crest; orifice of the anus and of the organs of generation on the right side.

This genus is spread through all the warm seas, and is especially to be found on the *Fucus natans*. Its foot, like that of nearly all the animals of this family, is admirably contrived for embracing the leaves of these plants. Only two species appear to be recorded.



*Scyllæa pelagica*.

#### Tritonia. (Cuv.)

**Generic Character.**—Animal limaciform, with the head not very distinct, surmounted by two retractile tentacula,

in a sort of case, carrying an arched frontal veil but little extended; the mouth armed with two lateral horny jaws, which are trenchant and denticulated on the edges; foot long and channelled; branchiæ in form of branching tufts, ranged in a longitudinal series on each side of the back; organs of generation united on the anterior portion of the right side; anus situated more backward.

These animals also attach themselves to marine plants. They are closely approximated to the *Scyllæa*, of whose habits they entirely partake, and also, in great part, of their organization. M. Rang observes that the species are not as yet well determined, though many exist upon the coast of France. Among these Cuvier has anatomically considered *Tritonia Hombergii*.



*Tritonia Hombergii*.

#### Doridæ. (*Tritoniens*, Lam.; *Cyclobranchiens*, Blainv.; *Urobranches*, Latr.)

Animal furnished with four tentacles, two of which are superior and two inferior, under the border of the mantle; organs of respiration arborescent, and forming a tuft round the anus.

The genera placed under this family by M. Rang are *Polycera*, *Doris*, and *Onchidoris*; these the reader will find described and figured in the article CYCLOBRANCHIATA.

#### Placobranchidæ. (Rang.)

Animal with four tentacles, and furnished with two lateral membranous expansions proper for swimming, and hung (tapissées) above, as well as the whole dorsal surface, with branchial lamellæ.

#### Placobranchus. (Van Hasselt.)

**Generic Character.**—Animal oblong, cylindraceous, fleshy, with the mantle dilated on each side into two lobes or membranous fins, which are demicircular, embracing the whole length from the neck to the posterior extremity, and having the power of crossing themselves on the back, forming an internal canal open at both extremities; head not very distinct from the body, depressed, and carrying on its summit two small and approximated eyes; two pair of conical, not very elongated tentacles, the lower pair being a little flattened and triangular; mouth below slit longitudinally, and furnished on each side with a lamellar appendage; foot long, united to the mantle; branchiæ covering all the upper surface of the lobes and of the back, in the form of delicate, close-set, longitudinal lamellæ, and parting from a common centre at the anterior part; anus situated on the anterior portion of the right side; orifice of the sexual organs separated, that of the ovary a little before the anus, and that of the male organ at the base of the right tentacle.

This genus was founded on a mollusk discovered at Java by Van Hasselt a short time before his death. M. Rang, from such remarks as he could make on some specimens which were not well observed, confirms the exactness of the observations of Van Hasselt, though he is unable to add anything to his descriptions.



*Placobranchus ocellatus*. (Rang.)

c, upper tentacles; d, lower tentacles, or labial appendages; b, lobes of the mantle serving for swimming; f, branchiæ.

Like the *Aplysiæ*, *Placobranchus* elevates and crosses the lobes upon the back, and thus forms a canal open at both

ends, in which the ambient element circulates, so as to impinge on the branchiæ with which it is hung. The species which serves for the type, *Placobranchus ocellatus*, is rather more than two inches long.

**NUISANCE**, or **NUSANCE**, is a term in English law derived immediately from the French *nuire*, and ultimately from the Latin *nocere*, 'to hurt'; and, conformably to its etymology, it signifies an unlawful act or omission which occasions annoyance, damage, or inconvenience to others. Nuisances may consist of injurious acts done, or of omissions to perform duties prescribed by law, and are of two kinds, *common* or *public* nuisances, which affect all the king's subjects, and *private* nuisances, which injure individuals. Instances of the former are, annoyances in highways, public bridges, or navigable rivers, which are produced by rendering the passage inconvenient or dangerous, either positively by actual destructions, or negatively by omitting to repair in cases where the law imposes the duty of repairing.

Noxious processes of trade or manufacture in towns are common nuisances by reason of the danger to the health of the inhabitants; and brothels, disorderly alehouses, gaming-houses, and unlicensed stage-plays are held to be common nuisances, both on account of the injury done by them to public morals and of the danger to the public peace by drawing together numbers of dissolute and irregular persons. The remedy for a public nuisance is by presentment or indictment; and the offender, upon conviction, may be punished by fine and imprisonment. It is said also that in the case of a positive obstruction to the free enjoyment of a public right, it may form part of the judgment that the offender shall remove the nuisance at his own cost; 'and it seemeth to be reasonable,' says Hawkins (book i., ch. 75, sect. 15), 'that those who are convicted of any other common nuisance should also have the like judgment.'

Private nuisances are annoyances which affect individuals only. Thus, if my neighbour builds a house so near to mine that he obstructs my ancient lights, or throws the water from his roof upon my house or land, this is a private nuisance; so also if he keeps noisome animals, or sets up an offensive trade or hazardous manufactory so near to my dwelling-house that the free enjoyment of my property is interrupted either by injury to my health or comfort, or the apprehension of danger. The remedy for a private nuisance is an action upon the case, in which damages may be recovered according to the injury sustained.

**NULLIPORA**. Lamarck designated by this term certain species of Linnæan Millepores on whose surface no distinct pores are visible. Since the investigation of Schweigger on one of the most conspicuous species (*Millepora polymorpha*, Linn.), many naturalists appear to be satisfied that these mucoso-calcareous bodies, much as they resemble Madreporites and Millepores in general form, are not of animal origin. Of this opinion is Blainville, and consequently, in his system, the Nullipores are rejected from the place so long assigned them by Linnæus, Pallas, and Lamarck.

**NUMA POMPILIUS**, the second king of Rome, was, according to tradition, a native of the Sabine town of Cures. On the death of Romulus the senate at first chose no king, and took upon itself the government of the state; but as the people were more oppressively treated than before, they insisted that a king should be appointed. A contest however arose respecting the choice of the king between the Romans and Sabines, and it was at length agreed that the former should choose a king out of the latter. Their choice fell upon Numa Pompilius, who was revered by all for his wisdom and knowledge, which, according to a popular tradition, he derived from Pythagoras.

Numa would not however accept the sovereignty till he was assured by the auspices that the gods approved of his election. Instructed by the *camena*, or nymph, *Egredia*, he founded the whole system of the Roman religion; he increased the number of augurs, regulated the duties of the pontifices, and appointed the flamines, the vestal virgins, and the *Salii*. He forbade all costly sacrifices, and allowed no blood to be shed upon the altars or any images of the gods to be made. To give a proof that all his institutions were established by divine authority, he is said to have given a plain entertainment in earthenware dishes to the noblest among his subjects, during which, upon the appearance of *Egredia*, all the dishes were changed into golden vessels and the food into viands fit for the gods.

Numa also divided among his subjects the lands which Romulus had conquered in war, and secured their inviolability by ordering land-marks to be set on every portion, which were consecrated to *Terminus*, the god of boundaries. He divided the artisans, according to their trades, into nine companies, or corporations. During his reign, which lasted thirty-nine years, no war was carried on; the gates of Janus were shut, and a temple was built to Faith. He died of gradual decay, in a good old age, and was buried under the hill *Janiculum*; and near him, in a separate tomb, were buried the books of his laws and ordinances.

Such was the traditional account of the reign of Numa Pompilius, who belongs to a period in which it is impossible to separate truth from fiction. According to Niebuhr and the writers who adopt his views of Roman history, the reign of Numa is considered in its political aspect only as a representation of the union between the Sabines and the original inhabitants of Rome, or, in other words, between the tribes of the *Titenses* and the *Ramnes*.

(Livy, i., 18-21; Dionysius of Halicarnassus, ii., 58-76; Cicero, *De Republica*, ii., 12-16; Plutarch's *Life of Numa*; the *Histories of Rome*, by Niebuhr, Arnold, and Malden.)

**NUMANTIA**, a celebrated town of the Celtiberi in Spain, was situated on the river *Durius* (*Douro*), at no great distance from its source. (Strabo, iii., p. 162; Appian, *Rom. Hist.*, vi. 91.) It appears to have been the capital of the *Arevaci* (Appian, vi. 46, 66, 76; Ptolem., ii. 6); but Pliny states that it was a town of the *Pelendones*, a people who lived a little to the north of the *Arevaci*.

Numantia was situated on a steep hill of moderate size. According to Florus (ii. 18), it possessed no walls, but it was surrounded on three sides by very thick woods, and could only be approached on one side, which was defended by ditches and palisades. (Appian, vi. 76, 91.) It was twenty-four stadia in circumference. (Appian, vi. 90.) Its position has been a subject of considerable dispute; but it appears most probable that it was situated near the modern town of Soria.

Numantia is memorable in history for the war which it carried on against the Romans for the space of fourteen years. (Flor., ii. 18.) Strabo states that the war lasted twenty years; but he appears, as Casaubon has remarked, to include in this period the war which was carried on by Viriathus. (Strabo, iii. 162; and Casaubon's note.) The Numantines were originally induced to engage in this war through the influence of Viriathus. They were first opposed by Quintus Pompeius, the consul, B.C. 141, who was defeated with great slaughter (Oros., v. 4), and afterwards offered to make peace with the Numantines on condition of their paying thirty talents of silver. This negotiation was broken off by M. Popilius, who succeeded Pompeius, B.C. 139. Popilius however did not meet with any better success than his predecessor; he was ignominiously defeated, and obliged to retire from the country. His successors, Mancinus, Æmilius, Lepidus, and Piso, met with similar disasters; till at length the Roman people, alarmed at the long continuance of the war, appointed Scipio Africanus consul, B.C. 134, for the express purpose of the conquest of Numantia. After levying a large army, he invested the town; and having in vain endeavoured to take it by storm, he turned the siege into a blockade, and obtained possession of the place (B.C. 133), at the end of a year and three months from the time of his first attack. The Numantines displayed the greatest courage and heroism during the whole of the siege; and when their provisions had entirely failed, they set fire to the city, and perished amidst the flames.

(Appian, *Rom. Hist.*, vi.; Flor., ii. 17, 18; Livy's *Epitomes*; Plutarch's *Life of Marius*; Eutrop., iv. 17; Vell. Pat., ii. 4.)

**NUMBER**. The general considerations which this word would suggest cannot be treated independently of those required in treating the notion of ratio in general. As this will form a part of the subject of **PROPORTION**, we refer to that article as the continuation of the present one.

The notion of number is suggested by repetition or succession; and it is customary to call the actual things repeated, considered as a collection, a concrete number; while the notion formed from comparing the collection with one of the things collected is called an *abstract* number. This abstract number arises from repetition of objects, in



which the attention is directed to the repetitions as repetitions, and not to the objects as distinguished from any other objects. It is therefore a number of times, not a number of things. [MULTIPLICATION.]

If we never numbered any things capable of division into parts like themselves, our notion of number would rest in what is now called *whole* number. If the intellect were taught to count by the beating of a clock, and never came in contact with any other magnitude except that of the intervals between the beats, it is difficult to see how the idea of fractions would be obtained. But when we come to put together continuous magnitudes, which might increase or decrease without any alteration except that of magnitude, such as lines, surfaces, &c., we then begin to see that the unit is purely arbitrary, considered as a magnitude, so that the consideration of smaller or larger units, and the reduction of processes from one unit to another, become necessary. Hence the doctrine of fractions, and finally that of INCOMMENSURABLES.

The unit of magnitude and the unit of repetition are as distinct as concrete and abstract number. A given magnitude being chosen, we may fix our own ideas of other magnitudes and convey them to other persons by describing the repetitions of the given unit which will severally give the other magnitudes: but it is incorrect to say that in arithmetic we can operate upon magnitudes represented by numbers; the operations are performed by our minds upon notions of repetition, not of magnitude. Any question of numbers arising out of geometry might, so far as the pure arithmetical processes are concerned, as well have the prototypes of its numbers in collections of beats of a clock or motions of the arm, as in repetitions of lengths or areas. It is not true that such simple successions would suggest as many problems as geometry or commercial business; but that is a distinct consideration.

Discussion formerly took place upon the question whether 1 represents a number; it being asserted that *number* must be *more than one*. The settlement of such a question depends upon convention entirely, and is very easy. In the common sense of the word neither 1 nor 2 are numbers: a number of men, or of pebbles, would suggest the idea of more than two: in fact, number means indefinitely many; more than the eye can decide on without counting; *several*, that is to say, as many as require the *severing* which takes place in counting. With different persons this commencement of number, vulgarly speaking, may be different; all persons discern *three* without counting, and probably *four*; but it is certain that *five* must be severed by most persons, and *six* probably by all. Those who watch the progress of children can easily see that their scales of reckoning are successively one and more; one, two, and more; one, two, three, and more.

In the common playing-cards we decide by forms, not by numbers; and were not the nine distinguished from the seven by the different positions of the odd spot, there would be continual mistakes.

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In mathematical language, every numerical symbol is called number, including 0, 1, fractions, whole numbers, and even *infinity*.

The talent of easily combining and remembering numbers, or of calculation, is a perfectly distinct thing from that of mathematical invention, reasoning, or application; though the two are frequently confounded. Taking mathematicians of the highest order, some have been singularly gifted in this respect, some distinguished in neither way, and some more than commonly deficient.

A very deceptive mode of speaking is common with regard to numbers, which divides them into *cardinal* and *ordinal*. Thus *one, two, three, &c.* are cardinal numbers, while *first, second, third, &c.* are ordinal. The real distinction is that of numeral *nouns* and numeral *pronouns*, to the latter of which the term ordinal might properly be applied. That first, second, third, &c. are really pronouns is obvious if we consider that, so far as they go, *this, that, and the other* would supply their places. The so-called cardinal numbers denote collections; the ordinal numbers point out only the places of the several units of which a collection is composed. Even *one*, when its force is simply selective or distinctive,

is a pronoun, as in 'one or another.' [ARITHMETIC; MAGNITUDE; PROPORTION; QUANTITY; UNIT.]

NUMBERS, APPELLATIONS OF. Various names have been given to classes of numbers, each expressive of properties common to all in its class: they are pointed out in the following list:—

The whole scale, 1, 2, 3, &c., is called that of *natural* numbers; it is subdivided into the scale of *odd* numbers, 1, 3, 5, &c., and *even* numbers, 2, 4, 6, &c. These again are subdivided into *oddly odd* numbers, 3, 7, 11, &c.; *evenly odd* numbers, 1, 5, 9, &c.; *oddly even* numbers, 2, 6, 10, &c.; and *evenly even* numbers, 4, 8, 12, &c. These latter appellations are not in universal use, though they are very convenient. Thus with reference to division by two and by four, all numbers have names; but not with reference to any higher numbers. The expression of a number which divided by *m* leaves a remainder *n* (namely,  $mx + n$ , where *x* is a whole number) is so simple, that it is more easily written than described. When 0 is included in the list, it is considered as divisible without remainder by *every* number.

The division of numbers into *square* numbers, 1, 4, 9, 16, &c.; *cube* numbers, 1, 8, 27, 64, &c.; *fourth powers*, 1, 16, 81, 256, &c., and so on, may be carried to any extent.

A *prime* number is any one of the list 1, 2, 3, 5, 7, 11, 13, &c., no one of which is divisible by any number except unity and itself. A *composite* number is any one which is not prime.

A *figurate* number is any one out of any of the following series, the first excepted, which is only introduced as a basis.

	1	2	3	4	5	6 &c.
I.	1	3	6	10	15	21 &c.
II.	1	4	10	20	35	56 &c.
III.	1	5	15	35	70	126 &c.
IV.	1	6	21	56	126	252 &c.
V.	1	7	28	84	210	462 &c.
&c.				&c.		&c.

Each number is the sum of the numbers in the preceding row: thus 84 is the sum of 1, 6, 21, and 56, and 84 is the fourth number of the fifth order of figurate numbers. The

*n*th number in the first order is  $n \frac{n+1}{2}$ , in the second or

der  $n \frac{n+1}{2} \frac{n+2}{3}$ , in the third  $n \frac{n+1}{2} \frac{n+2}{3} \frac{n+3}{4}$  and so on.

*Polygonal* numbers, as their name imports [POLYGON], may be subdivided into triangular, quadrangular, pentagonal, hexagonal, &c. To find the numbers which bear the name of an *n*-sided figure, form a series beginning with 1 and consisting of terms increasing in arithmetical progression, with a common difference *n* - 2: and form the sums of terms of these series in the manner described. Thus for decagonal numbers, we have—

1	9	17	25	33	41 &c.
1	10	27	52	85	126 &c.

and the decagonal numbers are 1, 10, 27, &c. The *m*th number of the *n*-sided order of figures is

$$1 + nm \frac{m-1}{2} - (m-1)^2$$

The following are some of the polygonal numbers:—

Triangular	1	3	6	10	15	21 &c.
Quadrangular	1	4	9	16	25	36 &c.
Pentagonal	1	5	12	22	35	51 &c.
Hexagonal	1	6	15	28	45	66 &c.

*Pyramidal* numbers are formed by summing the polygonal numbers; thus to find pentagonally pyramidal numbers, take the pentagonal numbers—

1	5	12	22	35	51 &c.
1	6	18	40	75	125 &c.

Numbers were once considered as *abundant*, *perfect*, and *defective*. An abundant number was one in which the sum of all its divisors (unity included, but not itself) exceeds the number: thus 12 is an abundant number, because  $1 + 2 + 3 + 4 + 6$  is greater than 12. A perfect number was one in which the sum of all the divisors was equal to

the number: thus 6 is  $1 + 2 + 3$ , and is a perfect number, as is 28, or  $1 + 2 + 4 + 7 + 14$ . A defective number was one in which the sum of the divisors is less than the number, as 10, in which  $1 + 2 + 5$  is less than 10. Whenever  $2^n - 1$  is a prime number, then  $2^n - (2^n - 1)$  is a perfect number; thus  $2^2 - 1$ , or 127, is a prime number, whence  $2^6 (2^7 - 1)$ , or  $64 \times 127$ , or 8128, is a perfect number.

*Amicable* numbers are those each of which is equal to the sum of all the divisors of the other. Such are

284 and 220  
17296 and 18416  
9363583 and 9437056.

Other names have been invented descriptive of classes of numbers; but the preceding are those which most often occur in the past history of mathematics. With the exception of SQUARE, CUBE, PRIME, *even*, and *odd*, the preceding appellatives rarely appear in modern works.

## NUMBERS, FIGURATE AND POLYGONAL [NUMBERS, APPELLATIONS OF.]

**NUMBERS, THEORY OF.** The theory of numbers is in fact the science of whole or integer numbers, and its most general problem is: 'Given any equation whatsoever involving two or more unknown quantities, or any number of equations between a greater number of unknown quantities, to determine every possible solution in which the values of the unknown letters are whole numbers.' It may also be considered that the science extends to the determination of all solutions which contain nothing but rational or commensurable fractions, all surd quantities or incommensurables being excluded. If, for example, the equation  $x^2 + y^2 = 1000$  were to be solved,  $x$  and  $y$  being whole numbers or rational fractions, let the rational fractions reduced to a common denominator be  $p : z$  and  $q : z$ ; then the equation becomes  $p^2 + q^2 = 1000 z^2$ ; and if all possible whole values of  $p$ ,  $q$ , and  $z$  be found, all the fractional solutions of the former equation can be exhibited.

Connected with the science before us is a very large quantity of properties of numbers, of which it must be said that they can be proved easily enough, but cannot be explained. Usually in retracing the steps of an algebraical demonstration, we can easily connect the result with common and self-evident notions, which seem both to justify the conclusion, to render it natural, and destroy much of the curiosity, and even interest, with which it is looked at by a person used to algebra, who hears of the conclusion for the first time. In the theory of numbers it seems to us that the curious character of the conclusions is not so much lessened by the demonstrations, and perhaps this may be the reason why the science becomes a sort of passion, as Legendre remarks, with most of those who take it up. The instances given by the writer just cited, in his preface, will show the sort of properties which we speak of. If  $c$  be any prime number, and  $N$  any other number not divisible by  $c$ , then  $Nc - 1$  is always divisible by  $c$ . Then  $2^6 - 1$ , or 63, is divisible by 7. Again, if any prime number divided by 4 leave a remainder 1, it is the sum of two square numbers: thus 13 is the sum of 9 and 4, 17 of 16 and 1, 29 of 25 and 4, &c.

The theory of numbers is not of much immediate practical utility in the applications of mathematics, which generally involve continuously increasing magnitude, and in which therefore the introduction of whole numbers is matter of convenience, and not of necessity. Again, the data of such applications are usually only approximate, so that an answer in whole numbers, should such a thing occur, is not exact, and possesses no particular interest. Hence this theory is little studied by a very large class of mathematicians, among whom it is not uncommon to meet with a person deeply versed in the higher analysis, who does not even know the principal results obtained by Gauss or Legendre. The subject is, in fact, an isolated part of mathematics, which may be taken up or not, at the choice of the student. It may possibly at some future time be connected with ordinary analysis, that is to say, the determination of the integer solutions of a set of equations may not be so distinct a thing from that of a mere solution, integer or not, as it is at present. In fact, a hint given by M. Libri, in a tract presently to be cited, does give completely the means of assimilating the expression of a problem in this theory to that of one in ordinary analysis. Suppose, for example, it is required to solve in whole numbers the equation  $x^2 + y^2 = x^2$ . Let  $\pi$  represent two right angles; then it is well known that  $\sin \pi x = 0$  when  $x$  is a whole number, and

never else; so that 'required a solution of  $x^2 + y^2 = x^2$  in whole numbers' is precisely the same problem as 'required any solution of the three equations  $x^2 + y^2 = x^2$ ,  $\sin \pi x = 0$ ,  $\sin \pi y = 0$ .'

The earliest consideration of the theory of numbers may have been made in India [VĪGA GANĪTA]; but the earliest treatise is probably that of Diophantus, which consists of nothing else but problems of this science, inasmuch that the theory itself has been sometimes called the Diophantine analysis. The subject then rested, without making any progress, until the time of Bachet de Meziriac and FERMAT, the editor and commentator of Diophantus. The subject rested again until the time of the man who literally left no part whatever of mathematics unaugmented, Euler. After him, Lagrange, Legendre, and Gauss applied themselves contemporaneously to this theory. The works of the two latter are the separate treatises on this particular science, in which the advanced mathematical student must look to know its present state. Various Memoirs of MM. Cauchy and Libri may also be mentioned; one in particular by the latter (in the 'Mémoires de Mathématique et de Physique,' vol i., Florence, 1829), in which the subject is made to have more resemblance than usual to ordinary analysis.

The 'Disquisitiones Arithmeticae' of Gauss (Brunswick, 1801) were translated into French by M. Poulet-Delisle (Paris, 1807). The 'Théorie des Nombres' of Legendre (third edition, Paris, 1830) has the advantage of coming later than that of Gauss (which itself came after the first edition of Legendre's), and of using methods and notations which are more familiar to the mathematician. Both are works of great originality: that of the German is condensed, and full of historical information; that of the Frenchman easier to follow, but, like most French works, deficient in precise historical reference. It is not a little singular that the two great writers on this subject should have been the men who, independently of each other, introduced the method of LEAST SQUARES.

For a notice of one prominent discovery of Gauss, see POLYGON and ROOF.

The beginner in algebra may obtain some command over equations of a simple character, not exceeding the second or third degree, by a method which is, we believe, due to Playfair, or which, at least, is published in the collection of his works. Let the equation be, for instance,  $ay^2 + bxy + x^2 = z^2$ , in which  $x$ ,  $y$ , and  $z$  are to be whole numbers. Throw 'he equation into a form which admits of both sides being reducible into factors; for instance,

$$y(ay + bx) = (z - x)(z + x).$$

If then  $z - x = vy$ , we have  $z + x = (ay + bx) : v$ , which equations give

$$x = \frac{(a - v^2)z}{a - bv + v^2} \quad y = \frac{(2v - b)z}{a - bv + v^2}.$$

Assuming  $v$  at pleasure,  $z$  may be easily taken so as to make both  $x$  and  $y$  whole numbers; and the same method will succeed in many equations.

**NUMBERS OF BERNOULLI.** This name is given to certain numbers (we here see the mathematical use of the word, for they are all fractions) first used by James Bernoulli, in his 'Ars Conjectandi.' They are in fact (though not so considered by Bernoulli) the coefficients of the powers of  $x$  in  $1 : (e^x - 1)$ . We should hardly have given them a place here, as our list of such ultimate references in mathematics is by no means complete, if it were not that they only appear to a sufficient extent in one English work that we know of (Peacock's Examples). Let

$$\frac{1}{e^x - 1} = \frac{1}{x} - \frac{1}{2} + \frac{B_1 x}{2} - \frac{B_2 x^2}{2 \cdot 3} + \dots$$

a form which it is shown to take. Then  $B_1, B_2, B_3$ , &c. are what are called the numbers of Bernoulli, and the following list will show twenty-five of them, the first column being the index of  $B$ , the second the numerator of the fraction, and the third its denominator. As far as  $B_{25}$  these are taken, from Euler's Differential Calculus, all the rest (and the logarithms) from Grunert's Supplement to Klugel, which professes to take the additional numbers from a work of H. A. Rothe, and the logarithms from Eytelwein's work on the higher analysis:—

No.	Numerator.	Denominator.
1	1	6
3	1	30
5	1	42
7	1	30
9	5	66
11	691	2730
13	7	6
15	3617	510
17	43867	798
19	174611	330
21	854513	138
23	236364091	2730
25	8553103	2
27	23749461029	870
29	8615841276005	14322
31	7709321041217	510
33	2577687858367	6
35	26315271553053477373	1919190
37	2929993913841559	6
39	261082718496449122051	13530
41	1520097643918070802691	1806
43	27833269579301024235023	690
45	596451111593912163277961	282
47	5609403368997817686249127547	46410
49	495057205241079648212477525	66

Thus the coefficient of  $x^{16}$ : 1.2.3...15 in the development of  $1 : (e^x - 1)$  is 3617 : 510, or  $B_{15}$ . The logarithms of the first eighteen numbers are as follows:—

No.	Logarithm.
1	0.2218487496—1
3	0.5228787453—2
5	0.3767507096—2
7	0.5228787453—2
9	0.8794260688—2
	0.4033154004—1
13	0.0669467896
5	0.8507783387
17	1.7401350433
19	2.7235576597
21	3.7918359878
23	4.9374188514
25	6.1539724516
27	7.4361345055
29	8.7792940212
31	10.1794459554
33	11.6330790734
35	13.1370898829

The higher numbers may be approximately verified by the following rule. Let  $\pi$  be the ratio of the circumference of a circle to its diameter; then

$$B_{2x-1} = 2 \frac{1.2.3 \dots 2x-1.2x}{(2\pi)^{2x}} \text{ nearly.}$$

We shall have some occasion to point out the uses of the numbers of Bernoulli in the article SERIES, in which also misprints, if any should occur, in the preceding tables will be noted. The theory of these numbers will be found in Peacock's translation of Lacroix, Euler's 'Differential Calculus,' Lacroix's 'Differential Calculus,' 3 vols., and in a very elaborate article ('Bernoullische Zahlen') in the work of Grunert already cited.

NUMBERS, THE BOOK OF, one of the books of the Pentateuch. In Hebrew it has two titles, *בְּרֵאשִׁית*, and *הַשְּׁפָא*, which is the first word of the book, and *בְּמִדְבָּר*, in the desert, which is the fifth word in the first verse, and which applies to the whole book, inasmuch as the events which it records took place in the desert. Its title in the Septuagint is *Ἀριθμοί*, Numbers, because it contains the censuses of the people of Israel (chaps. i.-iii., and xxvi.).

The first four chapters of this book consist of separate accounts of commands given by God to Moses, while the Israelites were encamped at the foot of Sinai, respecting the census and the classification of the people, and the duties of the priests and Levites. The succeeding chapters (v.—x. 10) contain various laws, most of which are additions to those before given in the books of *Exodus* and *Leviticus*; and the rest of the book is occupied with the narrative of the journeys of the Israelites, from the time of their leaving Sinai to their second arrival at the Jordan, and their en-

campment in the plains of Moab. The time over which the book extends is from the first day of the second month of the second year after the departure from Egypt, to the first day of the eleventh month of the fortieth year of the same epoch. This part of the book also contains various enactments.

We learn from the last verse of the last chapter that this book was written by Moses 'in the plains of Moab by Jordan near Jericho,' and consequently just before his death. Vater has attempted to show that it is composed of short narratives written by different persons (vol. iii., p. 452, &c.), and De Wette adduces several passages which appear to disagree with each other, and with the parallel passages in the book of *Exodus*. (*Lehrbuch d. Hist. Krit. Einleitung in d. A. T.*, p. 180.)

This book is quoted or referred to in the New Testament (compare *Numb.*, xx. 11, with 1 *Cor.*, x. 4, and *Numb.* xxi. with *John*, iii. 14). The passage in chap. xxiv. 17-19, is generally understood as a prediction of the Messiah.

(Rosentmüller's *Scholia in Vet. Test.*; the *Introduction* of Eichhorn, Jahn, De Wette, and Horne, and Graves's and Vater's *Commentaries on the Pentateuch*.)

#### NUM'NIUS. [SCOLOPACIDÆ.]

NUMERAL CHARACTERS. There are three simple and obvious modes of constructing symbols of number. 1. By arbitrary invention. 2. By the choice of letters of the alphabet. 3. By a system of repetitions of a single unit, as I, II, III, &c., with marks of abbreviation. Some may doubt whether the first and third were ever really employed; but it is not known that we can assign to the Indian numerals any other origin than the first, and the third explains the Roman system with a degree of consistency which is most extraordinary, if it be only accidental coincidence.

Distinct numeral characters are found to have existed or to exist among the Chinese, Indians, and Arabs, &c., Phœnicians, Palmyrenes, Hebrews, Egyptians, Greeks, and Romans; and others are given as in ancient use among the Mexicans. Various representations of these will be found in the 'Encyclopædia Metropolitana,' article 'Arithmetic.' We shall here confine ourselves to the simplest explanation of those systems which will be wanted by the student of ancient literature. Of these, as it should seem, the Indian system may belong (though it may be doubted) to the first class; the Hebrew and the common Greek system to the second; the Roman, Phœnician, Palmyrene, ancient Greek, Egyptian, and Chinese, to the third class.

The system received from the Hindus through the Arabs, and now adopted throughout Europe, has been gradually much altered in the forms of the symbols. [ARITHMETIC.]

The Hebrews used the letters of their own alphabet, giving the finals a separate and particular value, as follows:—

Letter	א	ב	ג	ד	ה	ו	ז	ח	ט	י
Numeral Signification	1	2	3	4	5	6	7	8	9	10
	א	ב	ג	ד	ה	ו	ז	ח	ט	י
	20	30	40	50	60	70	80	90	100	
	א	ב	ג	ד	ה	ו	ז	ח	ט	י
	200	300	400	500	600	700	800	900	990	

The use of the final letters as signifying numbers is of newer date than the rest; the old system required the junction of subordinate numbers to express 500, 600, &c. Numbers not expressed above were made by juxta-position of letters denoting other numbers, according to a decimal subdivision, as among the Greeks; the only exception being 15, which, as 10+5 or *יד* made a word signifying the Creator, they wrote as 9+6, or *טז*. In a language like the Hebrew it would be impossible to prevent every combination of numbers from also standing for a word or words; and the Oriental nations accordingly have frequently expressed dates by sentences. Thus 'Hooshung Shah is no more,' rendered into Persian, expresses, in the numeral force of the letters, the year 837 of the Hegira, the date of the death of that prince.

The Greeks, in some enumerations, have three distinct methods of expressing numbers; but the first of them, which consists in the use of the letters of the alphabet to denote the successive books of a work, as in the *Iliad*, is as much a method of naming as of counting. Something more to the point is the old system which occurs on inscriptions,

in which the unit is represented by a single mark, five by  $\Pi$  (the initial of ΠΕΝΤΕ), ten by  $\Delta$  (that of ΔΕΚΑ), and 100 by  $\text{H}$  (that of ΗΕΚΑΤΟΝ). And in all cases five of any symbol are written by inclosing the symbol in  $\Pi$ : thus  $\Pi\Delta$  is five tens, and  $\Pi\text{H}$  is five hundreds. Thus 879 is  $\Pi\text{H}\text{M}\text{H}\text{H}\text{H}\Delta\Delta\Delta\Pi\Pi\Pi\Pi$ . This ancient Greek method, as found on inscriptions (which, according to Heilbronner, is alluded to in a written work by Herodian only), is supposed to be as old as the time of Solon. The Egyptian hieroglyphic system is on the same principle, but without abbreviations; the symbol of ten resembling that just given for five.

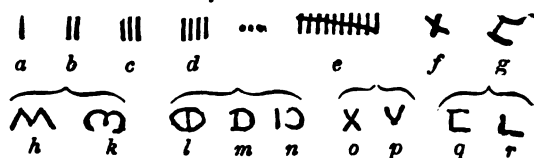
In describing the later Greek notation, we leave out of view the extensions made by the mathematicians, the principle of which is described in ARITHMETIC. It appears most distinctly that the system was made either at a time when the Greek alphabet was in possession of more letters than it permanently retained, or that it was introduced into Greece by communication with some nation (the Phœnician, perhaps) which had some additional letters. The *Vau* of the Hebrew and Phœnician, which stands for six, and is wanting in the Greek alphabet, appears in their numeral system under the name of *ἐπίσημον βαῦ*, and is expressed by a symbol resembling  $\epsilon$ , not very unlike the *Vau* turned the other way. The *Koph* and *Tsaddi* appear under the names of *ἐπίσημον κοπὰ* and *ἐπίσημον σαντι*, with symbols expressed in our types by  $\zeta$  and  $\alpha$ ; but the former is one behind its place in numeral signification, being 90 among the Greeks and 100 in the East: the latter takes the same numeral place as the final *Tsaddi* in the Hebrew system. The word *air* will be a useful guide to the letters beginning the several scales, as follows:—

Letter	$\alpha$	$\beta$	$\gamma$	$\delta$	$\epsilon$	$\zeta$	$\eta$	$\theta$	
Numerical Signification	1	2	3	4	5	6	7	8	9
	$\iota$	$\kappa$	$\lambda$	$\mu$	$\nu$	$\xi$	$\omicron$	$\pi$	$\varsigma$
	10	20	30	40	50	60	70	80	90
	$\rho$	$\sigma$	$\tau$	$\upsilon$	$\phi$	$\chi$	$\psi$	$\omega$	$\alpha$
	100	200	300	400	500	600	700	800	900
	$\alpha'$	$\beta'$	$\gamma'$	$\delta'$	$\epsilon'$	$\zeta'$	$\eta'$	$\theta'$	
	1000	2000	3000	4000	5000	6000	7000	8000	9000

The Roman notation, including all the varieties which occur in printed works, is as follows:—

1 I	50 L
2 II	60 LX
3 III	70 LXX
4 IIII, IV	80 LXXX, XXC
5 V	90 LXXX, XC
6 VI	100 C
7 VII	200 CC
8 VIII, IIX	300 CCC
9 VIIII, IX	400 CCCC
10 X	500 D, I $\zeta$
11 XI	600 DC, I $\zeta$ C
12 XII	700 DCC, I $\zeta$ CC
13 XIII, XIIV	800 DCCC, I $\zeta$ CCC
14 XIII, XIV	900 DCCC, I $\zeta$ CCCC
15 XV	1000 CI $\zeta$ , M, $\infty$ , I
16 XVI	2000 CI $\zeta$ CI $\zeta$ , II $\zeta$ CI $\zeta$ , IIM
17 XVII	5000 I $\zeta$ $\zeta$ , V
18 XVIII, XIIIX	10000 CCI $\zeta$ $\zeta$
19 XVIII, XIX	50000 I $\zeta$ $\zeta$ $\zeta$
20 XX	100000 CCI $\zeta$ $\zeta$ $\zeta$
30 XXX	1000000 CCI $\zeta$ $\zeta$ $\zeta$ $\zeta$
40 XXXX, XL	

The grammarian Priscian would have it that I denoted unity, because the Greek word  $\mu\alpha$ , with  $\mu$  cut off, has  $\alpha$  for its first letter; that V is five, as being the fifth vowel, and X ten, as being the tenth consonant, of the Greek alphabet. Any explanation of this system which endeavours at an alphabetical deduction must, as far as has yet been seen, fail entirely in giving a probable origin. The following scheme however contains suggestions of some antiquity, and certainly, as before remarked, is either a true explanation or a most extraordinary coincidence:—



Imagine a person used to decimal counting by means of

the fingers having recourse to simple counting by making a mark for each successive unit, as in  $a, b, c$ , &c. At ten he might be expected to make some symbol that his *handful* was completed, and the drawing a mark through the whole ten unit symbols, as at  $e$ , would do very well. This he might abbreviate, as at  $f$ , retaining only the symbol of a unit and that of the line drawn across. The handful of tens, or one hundred, might be represented by retaining only the unit symbol and two ligatures, namely, that of the tens and that which made all the ten tens into one symbol, as at  $g$ . The ten hundreds would require a unit with three ligatures, or four strokes altogether, which, if they were written without taking the pen off, might be made as at  $h$ , which might degenerate into  $k$ , and finally into  $l$ . Again, by cutting  $l$  into two halves, we have  $m$  or  $n$ , which might suggest themselves as proper representatives of half a thousand, or five hundred. Similarly bisection of  $f$  and  $g$  or of  $o$  and  $q$  would suggest  $p$  and  $r$  as proper symbols for the halves of ten and one hundred. The symbol  $a$  has a resemblance to  $L, f$  to  $X, g$  to  $C, h$  to  $M, m$  to  $D, p$  to  $V$ , and  $r$  to  $L$ .

We cannot find any precise information upon the time or the commencement of the principle of local value which prevails to a certain extent throughout the Roman system, namely, that a smaller symbol before a larger one, in numbers less than one hundred, denotes a subtraction, after it an addition. This principle does not appear in the Phœnician or Palmyrene notations, which otherwise much resemble the Roman in their principle of notation, though they approximate to pure vicenary scales, both adopting distinct symbols for twenty.

The Chinese use three systems: the first, not very simple, and ancient; the second, intentionally complicated, and employing symbols of words to denote numbers, is introduced in deeds and other instruments, to render alteration difficult; the third, a simplification of the first, supposed to have been made by the Jesuit missionaries.

For further information on the subject of this article, with abundant references, see the article 'Arithmetic' in the 'Encyclopædia Metropolitana,' by Dr. Peacock.

NUMERATION is a term generally applied to the art of representing numbers by distinct names and symbols, a sense in which the word is used by the oldest writers. Every treatise on arithmetic must necessarily begin with something on this art of counting and representing the results of counting, on the goodness of which, slight and easy as any method may appear to which we have been habituated from childhood, the progress of the arts of life, to say nothing of the mathematical sciences, is in no slight degree dependent. The time is gone by for a formal eulogy upon the benefits of any fundamental method of expression; we will therefore content ourselves with quoting a part of that which is found in the first English work on arithmetic, Robert Recorde's 'Grounde of Artes' (1551, perhaps 1540). We quote this also because it is an instance (the only one we ever met with in a mathematical work) of the species of doggerel comic verse afterwards in use on the stage (see the 'Comedy of Errors'), which has a sort of measure and rhyme, though printed in the form of simple prose in the work from which we cite (we put the syllables which are meant to rhyme in italics). *'Master.* Wherefore in all great workes are clerks so much desired? Wherefore are auditors so richly *fed*? What causeth geometricians so highly to be *inhaused*? Why are astronomers so greatly *advanced*? Because that by number such things they *find*, which else would far excel man's *mind*. . . . *Master.* Exclude number, and answer to this question: How many years old are you? *Scholar.* Mum. *Master.* So that if number want, you answer all by *mummes*? How many miles to London? *Scholar.* A poak full of *plums*. . . . *Master.* If number be lacking, it maketh men *dumb*, so that to most questions they must answer *mum*. *Scholar.* This is the cause, sir, that I judged it so *vile*, because it is so common in talking every *while*; for plenty is not dainty, as the common saying is. *Master.* No; nor store is no sore, perceive you *this*? The more common that the thing is being needfully *required*, the better is the thing and the more to be *desired*. But in numbring, as some of it is light and *plain*, so the most part is difficult and not easie to *attain*.'

The earliest method of signifying a large number must have been such a one as the scholar uses above, when he designates a large number of miles as a 'poak full of plums,' namely, the similitude of some visible or well-known *calce*

tion of units. The fingers of the hand, or of both hands, or the united number of fingers and toes, furnished natural collections of reference on which the various quinary, decimal, and vicenary scales in existence have proceeded. The transition from counting by tens to counting by dozens might have been caused by the facility of subdivision which the number twelve possesses, though we rather doubt this explanation, at least unless we assume that the division of the Roman *As* into twelve *uncia* is to be explained on the same principle. From this we think came the method of reckoning by dozens to be introduced throughout Europe, as would that by thirteens, if the Roman coin or weight had been so divided.

Our present numerative system is stated by writers to employ the words unit, ten, hundred, thousand, million, billion, trillion, quadrillion, quintillion, sextillion, septillion, octillion, nonillion, &c. But the greater part of this is pure statement; for the terms billion, trillion, &c., though defined by arithmetical writers, have never found their way into common use, the want of such large numbers having never been experienced. The French indeed have naturalised the term *milliard*, meaning one thousand millions, in matters of public debt and revenue, which only shows how little the term *billion* has been used among them, since, according to their writers, the milliard and billion are the same things. Tonalst expressly says, that in his time (Henry VIII.) the common reckoning from millions was made by millions of millions. &c., and the word *millio* is noted as a vulgarism by him (neither is it among the recognised barbarisms of Ducange). Recorde uses nothing more than millions repeated; so that it seems the billions and higher denominations were never anything but a fancy of arithmetical writers, conceived after the time when elementary works ceased to be written in Latin. The probability of this is increased by their meaning different things in different countries: with us the billion is a million of millions, a trillion is a million of billions, and each denomination is a million of times the one preceding; with the French and the other continental nations the billion is a thousand millions, and each denomination is a thousand times the preceding. According to English writers, the number 1,234,567,891,234,567,891 is one trillion, 234,567 billions, 891,234 millions, and 567,891; according to the French writers, it is one quintillion, 234 quadrillions, 567 trillions, 891 billions, 234 millions, 567 thousands, and 891. For common purposes the denominations higher than a million may be abandoned, it being remembered that all the figures on the left, after six are taken off on the right, are so many millions, and all above twelve figures so many millions of millions. In writing, round numbers of millions should be written as such, thus, 638 millions, not 638,000,000: in computation it is of course a different thing. Some authors seem to think it very scientific to parade ciphers, sometimes by the dozen, and so it is, no doubt, since it shows they know how many ciphers go to a million or a million of millions; but no reader likes to stop and examine 000,000,000,000, when the words 'million of millions' would have done equally well.

The decimal system, made complete, supposes a point always to be placed at the end of the units, to separate them from the fractions which may follow. When there are no fractions, the point is useless, as in 675° or 675° 000, which is 675. The numbers on the right of the point, successively denoting tenths, hundredths, thousandths, &c. of a unit [FRACTIONS], are in denominations which have not received distinct names. The modern French call them decimes, centimes, &c.; and the attempt has before now been made (see Wybald's 'Tactometria' 1650), to introduce centesms, millesms, &c. into English, but with no success.

The principle of *local value* [ARITHMETIC], which distinguishes our system of numeration from that of the Greeks and Romans, is applicable to any system, whether decimal or not. If 10 stand for *ten*, that is, if units in the second column are ten times in value those of the first column, nine numeral symbols besides the cipher are requisite; but if 10 had signified fifteen, it would have been necessary to have fourteen distinct symbols of number besides the cipher, since 10, 11, &c. now stand for sixteen, seventeen, &c. In such an explanation, the frame-work of our numerical language (being decimal) is not well calculated to give an easy comprehension of the change: we should rather invent a word for fifteen, or five and ten, say A; whence A-one, A-two, &c. would be the spoken sounds answering to

what we now call sixteen, seventeen, &c.; while *ten*, *eleven*, *twelve*, *thirteen*, and *fourteen* would require new names not connected in etymology with *ten*.

The method of reducing a number, decimally expressed, to another in which the *radix* or base of the system (as *ten* is that of the common one), is *a*, is as follows: divide the number successively by *a*, expressed in the decimal system; the remainders give the units, *as*, *aas*, &c. of the new expression. Thus if 12376 is to be expressed in the *quinary* system, whose base is 5, we should have the following process:—

5)12376 Rem.	Number required,
5)2475 1	344001.
5)495 0	Decimal.
5)99 0	3 × 5 <sup>4</sup> = 9375
5)19 4	4 × 5 <sup>4</sup> = 2500
5)3 4	4 × 5 <sup>3</sup> = 500
0 3	1 = 1
	12376

This exhibits both the reduction to the quinary system and the restitution of the decimal expression; but if the number had been given in the quinary system, it might have been reduced to the decimal system by the same rule, the new base ten being, in the old or quinary system, represented by 20, and the rule of division being performed by the use of five in the same manner as ten is used in the decimal system.

20)344001 Rem.	Number required,
20)14422 11 or 6	12376.
20)443 12 or 7	Decimal. Quinary.
20)22 3	1 × (10) <sup>4</sup> = 310000
20)1 2	2 × (10) <sup>4</sup> = 31000
0 1	3 × (10) <sup>3</sup> = 2200
	7 × 10 = 240
	6 = 11
	344001

The quinary being supposed the old system, as soon as we come to the remainder 11, we have to invent a new symbol (say 6), since 11, in the *new* system, is to stand for eleven. For further examples, see the 'Library of Useful Knowledge: Treatise on the Study of Mathematics.'

In teaching the elements of numeration by the abacus [ABACUS], it is desirable that exercise should be given in several different systems, were it only to prevent the formation of that impression which so many students long retain, that the decimal system is natural and necessary. The want of words for the denominations will be the only difficulty; this may be got over by using the letters A, B, C, &c. to represent them. Thus if the system be quinary, A counts as one ball on the second row or five on the first, B as one ball on the third row, five on the second, or twenty-five on the first, and so on. All the balls on the second row may be marked A. those on the third B, &c.

NUMERATOR (or Numerer), the part of a fraction which states how many of the aliquot parts of a unit are taken, such as are described by the denominator. Thus  $\frac{1}{3}$  being three, not of units, but of sevenths of a unit, 3 is the numerator.

NUMERIA'NUS, MARCUS AURELIUS, succeeded to the throne conjointly with his elder brother Carinus, after the death of their father, at the beginning of A.D. 284. Numerianus was with the army in Mesopotamia at the death of Probus; but instead of following up the advantages which his father had gained over the Persians, he was compelled by the army to abandon the conquests which had been already made, and to retreat to Syria. During the retreat a weakness of the eyes obliged him to confine himself to the darkness of a litter, which was strictly guarded by the Prætorians. All orders were issued by Arrius Aper, the præfect of the Prætorians, who was the father-in-law of the emperor. The absence however of Numerianus excited the suspicion of the soldiers; and when the army, after a march of eight months, arrived at Chalcedon on the Bosphorus, they insisted upon seeing their prince, and accordingly burst into the imperial tent, where they only found the dead body of Numerianus. Suspicion naturally fell upon Arrius; and an assembly of the army was accordingly held, for the purpose of avenging the death of Numerianus and electing a new emperor. Their choice

fell upon Diocletian, who immediately after his election put Arrius to death with his own hands, without giving him an opportunity of justifying himself, which might perhaps have proved dangerous to the new emperor.

The virtues of Numerianus are mentioned by most of his biographers. His manners were mild and affable; and he was celebrated among his contemporaries for his eloquence and poetry. He successfully contended with Nemesianus for the prize of poetry, and the senate voted to him a statue, with the inscription, to 'Numerianus Cæsar, the most powerful orator of his times.'

(Vopiscus, *Numerianus*; Aurelius Victor, *De Cæsari-bus*, c. 38; Eutropius, ix. 12; Zonaras, book xii.)



Coin of Numerianus.  
British Museum. Actual Size.

**NUMERICAL**, as opposed to literal, in algebra, applies to an expression in which the coefficients of a letter are all numbers, and not letters. As opposed to algebraical, it applies to the magnitude of a quantity, considered independently of its sign. Thus  $-7$  is said to be numerically greater than  $-5$ , though algebraically less. [NOTHING.]

**NUMESIA'NUS**, or **NOMISIANUS**, a physician, born at Corinth, who deserves to be recorded as one of Galen's tutors (Galen *Anatomic. Administrat.*, lib. i., cap. 1), who informs us in another place (*Comment. in Hippocr.*, libr. 'De Naturâ Hominis,' Comment. 2), that Pelops, another of his tutors, was also one of this physician's pupils. He lived in the second century after Christ.

**NUMIDA**. [PAVONIDÆ.]

**NUMIDIA** was originally bounded on the east by the dominions of Carthage; on the west by the Mulucha, or Molocath (Sallust, *Jug.*, 19, 92; Strabo, p. 827. Casaubon), the modern *Mulcia*, or *Mohalou*; on the north by the Mediterranean, and on the south by the Gætuli. The Roman province of Numidia was of much smaller extent, being bounded on the west by the Ampsagas (*Wadi-al-Kebir*), and on the east by the Tusca (Zain, Shaw), and thus corresponded to the eastern part of Algiers.

The Numidians were originally a nomade people, whence they were called by the Greeks Nomades (*Νομάδες*), and their country Nomadia (*Νομαδία*, Polyb., xxxvii. 3; compare Sallust, *Jug.*, 18; Plin., *Hist. Nat.*, v. 2). This name seems to have been originally applied not merely to the inhabitants of the country to which the name of Numidia was afterwards restricted, but to all the nomade tribes of northern Africa; thus Appian (*Bell. Civ.*, ii. 44) mentions the Maurusii (Mauri) as nomades. But when the Greek and Roman writers speak of the Numidians, the term is usually limited to the two great tribes of the Massæsylii and Massylii, the former of whom extended along the northern part of Africa from the Mulucha on the west to the Ampsagas on the east, and the latter from the Ampsagas to the territories of Carthage.

When the Romans first became acquainted with the Numidians, which was during the course of the second Punic war, Syphax was king of the Massæsylii and Gala king of the Massylii. Gala had a son of the name of Masinissa, who possessed extraordinary powers both of mind and body. He was brought up at Carthage, and was so highly esteemed by Adherbal, that he promised to the young Numidian his daughter Sophonisbe in marriage. Before the marriage took place, Masinissa accompanied Adherbal into Spain, where he served with great credit in the war against the Romans. But during his absence, the Carthaginians, without the consent of Adherbal, gave Sophonisbe in marriage to Syphax, in order to secure his co-operation against the Romans. (Appian, *Hist. Rom.*, viii. 10.) This induced Masinissa to make a secret alliance with Scipio in Spain; but the Carthaginians, having obtained information of his proceedings, used every means to ruin his power. His father Gala had died during his absence in Spain, and the government had been usurped by one Mezetulus, who received the support of the Carthaginians. Masinissa however, on his return to Numidia, defeated Mezetulus; but

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he had scarcely obtained possession of the government, before he was attacked by Syphax, and compelled to leave his kingdom and retire to the neighbourhood of the lesser Syrtis, where he remained with a small body of adherents till the arrival of Scipio in Africa. (Liv., xxix. 29-33.) He accompanied Scipio during the remainder of the war, and in many engagements rendered essential service to the Roman arms. It was principally owing to the courage of Masinissa that Adherbal and Syphax were defeated, and that the latter fell into the hands of Scipio (b.c. 203). On this occasion Masinissa obtained possession of Sophonisbe; but finding that his connection with her did not meet with the approval of Scipio, who feared lest the daughter of Adherbal might withdraw him from his alliance with the Romans, he is said to have sent poison to Sophonisbe, and recommended her to destroy herself.

The great services of Masinissa did not pass unrewarded by the Romans. At the conclusion of the second Punic war he obtained all the dominions of Syphax and a considerable part of the Carthaginian territory, so that his kingdom extended from the Mulucha on the west to the Cyrenaica on the east, and completely surrounded the small district which was left to the Carthaginians on the coast. (Appian, viii. 106.) Masinissa laid the foundations of a great and powerful state in Numidia. He introduced the arts of agriculture and civilised life, amassed considerable wealth, and supported a well appointed army. He died at the age of 90, b.c. 149. (Appian, viii. 106; Strabo, p. 833; Polyb., xxxvii. 3.)

Masinissa left three sons, Micipsa, Mastanabal, and Gullussa. The two latter died soon after the death of their father, but Micipsa lived to b.c. 118, and bequeathed the kingdom to his two sons Adherbal and Hiempsal and to his nephew Jugurtha, who was an illegitimate son of Mastanabal. Jugurtha however, not content with a divided sovereignty, murdered Hiempsal, and obliged Adherbal to fly to Rome, where he appealed to the senate against the usurpation of his cousin. Many of the senators however were bribed by Jugurtha, and a commission was sent to Africa in order to divide Numidia between Adherbal and Jugurtha. The commissioners awarded the better part of the country to Jugurtha; but scarcely had they left Africa, before he again attacked Adherbal, defeated him in battle, besieged him in Cirta, and having obliged him to surrender, put him to a cruel death. When this news reached Rome, war was declared against Jugurtha, which, after being carried on with various success, was at length terminated by the capture and death of Jugurtha b.c. 106. [JUGURTHA.]

After the death of Jugurtha, the kingdom of Numidia appears to have been given to Hiempsal II. (Hirtius, *Bell. Afr.*, 56), who was probably the nephew of Hiempsal the son of Micipsa. Hiempsal II. was succeeded, about b.c. 50, by his son Juba I., who took an active part in the civil wars against Cæsar. [JUBA.] On the death of Juba I., b.c. 46, Numidia was reduced to the form of a Roman province by Cæsar, who intrusted the government of it to the historian Sallust. (Dion Cassius, xliii. 9.)

The chief town in Numidia was Cirta (the modern Constantina, or Constantineh), which was the principal residence of Syphax, Masinissa, Micipsa, and Juba. [CONSTANTINA.] Hippo Regius, the second town in the province, was situated near the coast about a mile and a half south of Bona. [BONA.] It was founded by the Phœnicians (Sallust, *Jug.*, 19), and is well known as the see of St. Augustin. It was called Hippo Regius to distinguish it from Hippo Zarytus in the province of Africa. It was a favourite place of residence with the Numidian kings. (Sil. Italic., iii. 259.) At the mouth of the Tusca was the small town of Tabraca, the name of which is still retained in the island of Tabar-kah at the mouth of the river. South of Tabraca, probably on the Tusca, was the important town of Vaga, or Vacca (*Beja* ?), which is described by Sallust as the chief commercial town in Numidia. (Sallust, *Jug.*, 47.) South-west from Vacca was Tagaste, a free state according to Pliny (v. 4), and celebrated as the birth-place of St. Augustin.

The position of Zama, near which the memorable battle was fought between Scipio and Hannibal, b.c. 201, is uncertain. Some writers have considered it the same as the modern Zamorah, which is situated south-west of Setif; but others, with more probability, identify it with the modern Zainah, south-east of Setif. We learn from Livy that Zama was five days' journey from Carthage (Liv., xxx. 29), which distance would better agree with the position of Zainah

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than with that of Zamorah. Zama was strongly fortified, and was occasionally the residence of the Numidian kings. (Sallust, *Jug.*, 56, 60, 61.) Juba fled to this town, after he had been defeated by Cæsar at Thapsus, but the inhabitants refused to admit him within the walls. (Hirtius, *Bell. Afr.*, 91.) Strabo relates that Zama was destroyed by the Romans (p. 829); but it is mentioned by Pliny (v. 4) as one of the free towns of the province; and the name of the bishop of Zama occurs in the councils of the African church.

An account of the principal places in the western part of the ancient kingdom of Numidia, which was afterwards included in the province of Mauritania, is given under MAURITANIA. The physical features of the country are described under ALGIERS and COSTANTINA. The best account of Numidia is in Shaw's *Travels*.

NUMISMATICS, NUMISMATOGRAPHIA, or NUMISMATOLOGY, the science of coins and medals. [COINS; MEDALS.]

NUMMULITE. [FORAMINIFERA.]

NUN. [MONACHISM.]

NUNCIO (*Nunzio*, in Italian; *Nuntius*, in Latin) signifies a messenger, but is used more particularly to designate the ambassadors sent by the pope to foreign courts. The nuncio is generally a prelate of the court of Rome; if a cardinal, he is styled 'legate.' Previous to the council of Trent, the papal nuncios in foreign countries acted as judges, in the first instance, of matters which were within ecclesiastical jurisdiction; but since that time they have acted as judges of appeal from the decisions of the respective bishops, in those countries only which are subject to the decretals and discipline of the council of Trent. In other kingdoms and states, such as France, Austria, Tuscany, &c., which, though Catholic, hold themselves independent of the court of Rome in matters of discipline, the nuncio has no jurisdiction whatever, and has merely a diplomatic character, like the minister of any other foreign power. (Père Richard, *Bibliothèque Sacrée*, art. 'Nonce.')

NUNCUPATIVE WILL. [WILL.]

NUÑEZ, or NO'NIUS, FERNAN, was of the house of Guzman. He is also called 'El Pinciano,' from Pintia Vaccæorum, the former name of Vallisoletum, now Valladolid, where he was born in the latter half of the fourteenth century. Although a knight of the military order of Sant' Iago, he devoted all his ardour to literary pursuits and the diffusion of learning through Spain, where he promoted the study of the Greek, after that of the Latin language had been rendered easy by Nebriensis (Antonio Lebrija or Nebrija). Among the many eminent literary persons who followed Nebrija's steps, Pinciano stood conspicuous, even before he went to Italy to receive further instruction from Philippus Beroaldus and Govian, a celebrated Greek refugee. On his return to Spain, Nuñez brought back numerous Greek books with him; and Cardinal Cisneros, who admired his talents, appointed him and Demetrius the Cretan professors of Greek at his university of Alcalá, and moreover entrusted to him and to Lope de Astuñiga the Latin version of the 'Septuagint.' Endowed with a lofty spirit and a high patriotic feeling, which were fostered by the writings of antiquity which he expounded, he fought in 1521 with the unsuccessful Commons of Castile against the tyranny of Charles V., or rather his courtiers, a set of unprincipled foreign adventurers, who took advantage of the young prince's vanity and inexperience. Being obliged to leave Alcalá, he took refuge at Salamanca, in which university he taught Greek, Latin, rhetoric, and the natural history of Pliny.

He died in 1553, above the age of eighty, at Salamanca, and left to that famous seminary his select library. He wrote for himself the following epitaph:—"Maximum vitæ bonum mors!"

Among his other great qualities he had that of being very abstemious, but although he abstained from wine, he was fond of inviting his friends and pupils to his table.

Besides the share that he had in the 'Complutensian Polyglot,' Nuñez published 'Annotationes in Senecæ Philosophi Opera,' the text of which writer he restored; 'Observationes in Pomp. Melam;' 'Observat. in Hist. Nat. C. Plin.,' which have often been reprinted; 'Glosa sobre las Obras de Juan de Mena,' which is full of classical learning; 'Letters to Zurita;' 'Refranes y Proverbios Glorados,' which he left incomplete in the midst of his infirmities, a valuable book to the commentator of Cervantes, as

Nuñez was well acquainted with Spanish proverbs, and skilful in applying them.

Gomez de Castro, or Gomecius, in his work 'De Rebus Gestis Fran. Ximeni,' Erasmus, Lucius Marinus Siculus, Lipsius, Nicol. Antonius, Isaac Vossius, Mayans, Teissier, and others, expatiate on the high talents and virtues of Fernan Nuñez de Guzman.

This writer must not be confounded with Alonzo Lopez Pinciano, Médico Cesáreo (physician to Charles V.), who attempted the epic in his 'El Pelayo,' and wrote in a series of letters the 'Philosophia Antigua Poética,' an extraordinary performance for the age, both as to substance and expression. It appeared at Madrid for the first time in 1596. This second Pinciano was the first modern scholar who ventured to think for himself on the subject of poetic art; he established a philosophical system, and went farther than his master Aristotle. By a careful and minute study of all the writings of that philosopher, he discovered that his 'Poetic' was but a fragment, for Aristotle refers repeatedly in his other works to a second part of the same 'Poetic,' which is lost; a fact which had escaped the notice of all previous commentators.

Pinciano endeavoured to restore dignity to poetry, and to develop its true character; he treats minutely of the senses, of the affections, the faculties of the understanding, and the pleasures of cultivated minds. He defines moreover poetical imitation more precisely than the Greek philosopher. His style however cannot now be considered as a model either of written or conversational language.

NUÑEZ, PEDRO. [VERNIER.]

NUREMBERG. [NURNBERG.]

NÜRNBERG, a very ancient city of Bavaria, in the circle of the Rezat, and formerly one of the most flourishing members of the Hanseatic League, is situated in 49° 27' N. lat. and 11° 4' 15" E. long. Nürnberg stands in an extensive and sandy but highly cultivated plain, 945 Paris feet above the level of the sea, on both banks of the river Pegnitz, which divides the city into two unequal parts: the smaller and northern is called the Sebaldus side, and the southern and larger the Lawrence side. The Pegnitz forms three islands within the walls, which are connected with each other and the city by seven stone and nine wooden bridges, and one suspension-bridge, which was commenced in 1824.

Though Nürnberg cannot be considered, properly speaking, as a fortified town, it is surrounded by an old wall, which has eight gates and a great number of round and square towers (Stein says 365, Hassel 119), and a moat nearly 200 feet broad. The circuit within the walls is three miles and a half, within which space there are many squares or markets, and gardens. The streets are in general broad and well paved, but crooked and irregular. The houses are very old-fashioned, retaining externally, with little alteration, the old Gothic style, and their internal arrangements recalling to mind the mode of private life of past ages. The fronts of the houses are often adorned with paintings: they are narrow, but often very deep, with a back front in a parallel street. One of the most remarkable ancient buildings is the old fortress called the Reichsfeste, which was probably erected in the tenth century, under the emperor Conrad I., and the care of which was confided in the middle ages to the burggraves of Nürnberg, the ancestors of the house of Hohenzollern. This fortress stands on a pretty steep eminence, and the exterior, having received no modern additions, is an excellent specimen of the ancient style. It contains a gallery of 549 pictures in 10 apartments, and many paintings on glass. The town-hall, one of the finest in Germany, is 275 feet wide, and contains, among other curiosities, a number of paintings by Albert Dürer, Hirschvogel, and others. Almost all the churches, 8 Lutheran, 1 Calvinist, and 1 Roman Catholic, are worthy of observation for their architecture and the works of art which they contain. That of St. Sebaldus contains the tomb of the saint adorned with fine statues of the twelve apostles, a noble altar, the celebrated crucifix by Veit Stoss, and painted-glass windows of extraordinary beauty. The church of St. Lawrence is a fine Gothic edifice, and is extremely rich in old German paintings. To each of these churches a Latin school is attached. The church of St. Egidius, which was built in the Italian style at the beginning of the eighteenth century (1711-18), has a fine altar-piece by Vandyck. Near this church is the gymnasium, in front of which the city erected, in 1826, the statue of Melancthon, by whom

that institution was opened in 1526. The church of St. Clara has paintings on glass, of the year 1278. In that of the Holy Ghost the regalia of the empire were formerly kept, by order of the emperor Sigismund in 1424, and likewise many pretended relics of the Passion of our Saviour. The former Dominican church contains the city library of 20,000 volumes, with a collection of the works of Melancthon and of works written at the time of the Reformation. Nürnberg is remarkable for its numerous and well-conducted public institutions of every kind, such as the gymnasium, the Polytechnic Institution, a great number of schools for all classes; 15 free-schools, in which the children are supplied with books, clothing, and bread gratis; a seminary for teachers; a society for the promotion of manufactures, which has founded a school of industry for above 300 girls, and a Sunday drawing-school for the sons of mechanics, in which there are nearly 400 pupils; a Bible Society, and a great many collections, both public and private, of works of art, antiquities, &c.

Before the trade with the East Indies took a new direction, after Vasco de Gama had doubled the Cape of Good Hope, Nürnberg was one of the most important commercial cities in Europe. It forwarded to the North the rich productions of India, which it received from Italy; nor was this the only source of its prosperity. The residence of the burgraves (from the year 1060) and occasionally that of the emperors was a great advantage, and, above all, its manufactures brought a great influx of wealth. Nürnberg was celebrated four hundred years ago for working in brass, iron, and other metals, and for the manufacture of a long list of articles comprised under the general denomination of Nürnberg wares, musical and mathematical instruments, hardware, and toys of all kinds, both of metal and wood. Public and private wealth accumulated, and not only the useful but the fine arts flourished; so that the history of the arts in Nürnberg is a very important part of that of the fine arts in general, especially of painting and engraving. The altered course of the East India trade, the attention of other states to the advantages of commerce, the ravages of the Thirty Years' War, dissensions between the nobility and the citizens, and an increasing load of debt, caused Nürnberg gradually to decline. Yet its trade is still considerable, especially in articles of its own manufacture in iron, steel, and brass; and in hardware of all kinds, turnery, looking-glasses, musical instruments, paper, engravings, painters' colours and pencils, glass, porcelain, watches, calicoes, carpets, and other articles too numerous to mention. The extraordinary cheapness of the Nürnberg toys, most of which are however made by the country-people in the hilly and wooded tract between Franconia and Thuringia, causes the trade in them to be very extensive and important. There is now an annual fair, at which a great deal of business is done.

Nürnberg is first mentioned in history in 1050, and obtained its first charter in 1219. As a free city of the circle of Franconia, celebrated for its industry and commerce, and for great services to the emperor and the empire, it retained its freedom among all the changes made in Germany in 1803. It had a territory, for the most part well cultivated, nearly 500 square miles in extent, with 40,000 inhabitants, and a revenue of 800,000 florins; but the public debt amounting, in 1797, to nine millions of florins, the revenue was not sufficient to pay the interest. The differences with the king of Prussia, who took possession of part of its territory, necessarily increased its difficulties, till the Act of the Confederation of the Rhine assigned over its territory to the king of Bavaria, a decision which was by no means agreeable to the inhabitants. The population of Nürnberg, including the suburbs and the territory, was officially stated to be, in 1826, 39,628, of whom 3200 formed the garrison. The latest accounts we have seen (1838) make the population 41,000, of whom about 3500 are Roman Catholics, and the great majority Lutherans.

The great painter Albert Dürer was a native of Nürnberg, and also Melchior Pfünzing and Hans Sach, the poets, and Martin Behem, who made the first serviceable terrestrial globe. Among the numerous inventions for which the world is indebted to Nürnberg are watches (first called Nürnberg eggs) by Peter Hele, the pedal by Heinrich Traxdorf, the air-gun by Lobzinger, the clarinet by C. Denner, brass by Erasmus Ebner, the lock for fire-arms by a person not known, and many others.

(The descriptions of Nürnberg and of the public edifices

are very numerous: among them are the 'Nürnbergisches Taschenbuch,' 1829; the 'Nürnberger Jahrbücher,' Hagen's 'Norica,' &c.)

NUT. [FILBERT.]

NUTATION. [PRECESSION AND NUTATION.]

NUTCRACKER, the name of an Insectorial bird, rarely seen in Britain, and whose place in the system it is rather difficult to fix. Some of its habits, and the worn appearance of the tail-feathers from climbing about the branches of trees, together with the nesting in hollows of trees, indicate a relationship to the *Picidae*. Its manners, which are said to resemble those of the Jay, and other circumstances connected with its food and organization, bring it into alliance with the *Crows*, to which family it is generally referred by ornithologists, and so placed as to approximate either to the *Woodpeckers* or *Starlings*. Mr. Vigors considers it as assimilating to the latter family, and especially to the genera *Cassicus* and *Barita*. Mr. Swainson makes it a subgenus of *Corvus* in his subfamily *Corvinæ*, placing it immediately after the subgenus *Pica*, and immediately before the genus *Barita*. The Prince of Musignano arranges it also under the subfamily *Corvinæ*, among which it occupies the last place in his 'Geographical and Comparative List,' whilst it immediately precedes the subfamily *Sturninæ*. Mr. Yarrell (*British Birds*) places it at the end of the *Crows*, and immediately before the *Woodpeckers*. Sir W. Jardine (*British Birds*) arranges the genus between the *Magpie* and the *Jay*. In Temminck's arrangement its place is between the *Jays* and the *Choughs* (*Pyrrhocorax*).

#### Nucifraga.

*Generic Character*.—Bill conical, longer than the head, straight, the upper mandible having the culmen rounded, overhanging the lower, both terminating in an obtuse and depressed point. *Nostrils* basal, round, open, concealed by hairs directed forwards. *Toes*, three before and one behind, the two outer being united at their base. *Tarsus* longer than the middle toe. *Wings* long and pointed, the first quill shortest, the fourth and fifth longest. (Gould.)

This genus is generally considered to comprehend only two known species:—the bird whose English name heads this article, and *Nucifraga hemispila*, which bears a considerable resemblance to it, though it is clearly a distinct species, described and figured in Mr Gould's 'Century of Birds,' from the Himalaya mountains. The student should however bear in mind that the Prince of Musignano and Mr. Audubon, both high authorities, the former from his extensive and accurate knowledge of genera and species, and the latter from the great attention which he has paid to the habits of the birds of America, include the *Corvus Columbianus* of Wilson in the genus *Nucifraga*.

We select as an example the European species, *Nucifraga Caryocatactes*.

*Description*.—Size about that of the *Jackdaw*, but the tail is longer. Plumage reddish umber-brown; the body, with the exception of the head and rump, dappled with large white spots which occupy the centre of each feather; wings and tail blackish, shot with green; the feathers of the latter (except the two middle ones) tipped with white. Bill and legs brownish black. Sexes, as in the crows generally, nearly alike. The female is, if anything, a little smaller and her plumage less lively.

This is the *Corvus Caryocatactes* of Linnæus; *Caryocatactes* of Willughby; *Casse Noix* of the French; *Ghiandaia Nucifraga* of Stor. degl. Ucc.; *Noctiolaja* of Savi; *Kurz und Langschnebliger Nussknacker* of Brehm; *Tannen Heher* (Pine Jay) oder *Türkischer Holzschreyer* of Frisch; *Notwecka*, *Notkraka*, of the Swedes; *Noddekrige* of the Norwegians; *Notkraake* of Brunnich; *Nussrabbe* of Meyer; and *Aderyn y cnau* of the antient British.

*Habits, Food, Reproduction, &c.*—The manners of the Nutcracker are said, by those who have observed it, to resemble in some degree those of the Jay, and some of its habits those of the *Woodpeckers*. Like the former it feeds on nuts and berries, as well as on the seeds of the pine, of which it appears to be very fond; and, like the latter, it climbs the trunks and branches of trees, tapping the bark with its bill to start the insects and their larvae that lurk beneath, and devour them. They are said to crack nuts much in the same way with the *Nuthatch*. The nest is formed in the hollows of trees, which the bird is supposed to enlarge after the manner of the *woodpeckers*. The eggs are five or six in number, of a yellowish white or grey.



a few spots of bright grey brown. Temminck states that it sometimes devours young birds and eggs.

**Geographical Distribution.**—Central Europe. The bird is a rare visitant to Great Britain, and does not appear to have been seen in Ireland. The only one Pennant ever heard of was killed near Mostyn in Flintshire. Montagu mentions one that was killed in Kent, and states that one was seen by an accurate observer near Bridgewater. He also notices two others, which were shot in 1808, one in Devon, the other in Cornwall. Mr. Selby mentions one that was seen in Netherwitton Wood in Northumberland. Mr. Rodd, of Penzance, gave Mr. Yarrell information of one that was seen on a tree on the banks of Hooe Lake. It is recorded by Dr. Moore as having been shot in Devonshire near Washford Pyne Moor. Another is said to have been lately noticed at Pepper Harrow Park, Lord Middleton's seat. Mr. Macgillivray gives instances of its having been shot in Scotland.

Temminck records varieties of pure white, or yellowish white, with deeper spots; sometimes with the wings and tail white.



The Nutcracker.

**NUTHATCH**, the vernacular name for a Scansorial British bird, with much of the habits of the Woodpeckers, and which may be taken as an apt illustration of the genus *Sitta* of Linnaeus.

Mr. Swainson places the genus in the subfamily *Sittinae*, being the second of his family *Certhiadae*. The Prince of Musignano makes it the first subfamily of that family.

**Generic Character.**—Bill straight, cylindrical, slightly compressed, subululated, acuminate. *Tongue* short, horny, and armed at the point. *Nostrils* basal and rounded, partly hidden by reflected bristles. *Feet* with three toes before and one behind, the outer toe being joined at its base to the middle one; hind toe of the same length as or longer than the middle one, with a long and hooked claw. *Tail* of twelve feathers. *Wings* rather short; the first quill very short, the third and fourth the longest. (Gould.)

Example, *Sitta europæa*, the *Common Nuthatch*, or *Nutjobber*.

**Description.**—Plumage above fine blue grey; quills and base of tail-feathers, except the two middle ones, black, the outer tail-feather on each side with a black spot near the tip. A black band passes from the bill through the eye down the sides of the neck, ending abruptly near the shoulders; throat whitish; rest of plumage below rufous brown blending into chestnut on the flanks; bill and feet black; iris hazel. Sexes alike.

This is in all probability the *Sitte* (Σίττη) of the Greeks, and *Sitta* of the Latins. It is the *Ziolo*, *Picchio grigio*, *Raparino*, and *Picchio formicajo* of the Italians; *Muratore* of Savi; *Torchepot* and *Pic-maçon* of the French; *Kleiber* and *Blauwecht* of the Germans; *Notracka* and *Notpacka* of the Swedes; *Spætt-meise* of the Danes; *Nat-Bake* of Brunnich; *Klener*, *Nusszhacker*, of Kramer; and *Delor y cnau* of the ancient British.

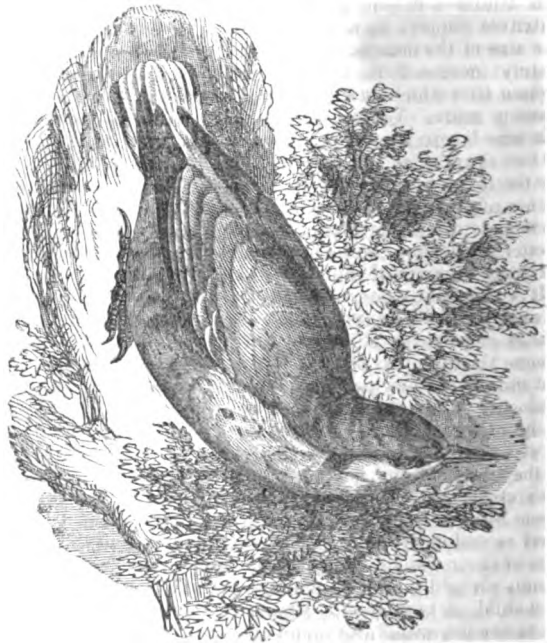
**Habits, Food, Reproduction, &c.**—Like the Woodpeckers and Creepers, the Nuthatch runs with facility upon and about the trunks and branches of trees; but the tail, which

is short and rounded, is of no assistance to the bird in its progress. Unlike the Woodpeckers however, the Nuthatch runs with the head downwards as well as upwards, and indeed the former position of the head appears to be the favourite one; it generally alights on a branch with the head in the downward position, and sleeps in that posture. It is almost constantly in motion. Its food consists of insects and their larvæ, berries, and nuts. The latter it fixes in some chink, and cracks them by repeated strokes of the bill. 'It is a pretty spectacle,' says Willughby, 'to see her fetch a nut out of her hoard, place it fast in a chink, and then, standing above it, with its head downwards, striking it with all its force, break the shell and catch up the kernel.' The same author found beetles in the muscular stomach or gizzard of one opened by him. The filberd gives the Nuthatch but comparatively little trouble; but the more dense hazel-nut calls forth greater energies, and when employed upon one of those nuts, the bird makes the neighbourhood rebound with the strokes of its bill. Its call-note in the spring is a clear shrill whistle. The nest is generally made with only a few dry leaves in the hole of a tree, and the eggs, which are from five to seven in number, are of grey-white spotted with reddish brown. If the hole selected be too large, the bird plasters up a part of it with mud, and will renew the plaster if destroyed, whence one of its French names.

The female, when surprised on the eggs or her young, makes a most determined defence with bill and wings, hissing at the intruder violently at the same time. It seems indeed to be a very attached bird. The old French quatrain says—

Le Torchepot et sa femelle ensemble  
Vivent en paix tout le long de l'Esté.  
Parquoy l'on dit, que qui est arrêté  
A son message au Torchepot ressemble.

Of its bravery and courage when made captive, a painful story is told in the 'Magazine of Natural History.' A Nuthatch had been winged by a sportsman, and was put into a small cage made of oak and wire. During a night and day, the period of his confinement, his tapping labour was incessant, and at the end of that time the wood-work of his prison was pierced and worn like worm-eaten timber. His impatience of his situation was excessive; his efforts to escape were unremitted, and displayed much cunning and intelligence. He was fierce and fearlessly familiar, and voraciously devoured the food placed before him. His hammering is described as having been peculiarly laborious, for he did not peck as other birds do, but taking a firm grasp with his great feet, he turned upon them as upon a pivot, striking with his whole weight, and thus assuming with his body the appearance of the head of a hammer in motion. This unfortunate bird sank at the close of the second day under the combined effects of his vexation,



Common Nuthatch.

assiduity, and voracity. The Rev. T. L. Bree mentions one which he caught in a common brick trap: when the bird was found, the bill appeared to be truncated, and he inferred that it had been fairly ground down to about two-thirds of its original length by the pecking of the bird at the bricks in its efforts to escape.

**Geographical Distribution.**—Europe generally. Temminck notes its range as extending far to the north and south, and as rather abundant in central Europe. Mr. Selby traced it in Britain as far north as the banks of the Wear and Tyne; and it is noted in Mr. Thompson's Irish list.

Mr. Gould describes and figures two other species, *Sitta rupestris* and *Asiatica*, in his 'Birds of Europe.'

The genus is found in India and America; and there are closely allied forms in the Indian Archipelago and in New Holland.

#### NUTMEG. [MYRISTICA.]

**NUTRITION.** One of the chief differences between inorganic and organic bodies is, that the former retain their form and other characters by a passive resistance to change; the latter by a constant change of their particles, in which those that in the constant actions of life or by the influence of external agents have been destroyed, are replaced by others similar to themselves. This constant change is effected by the process of nutrition. Nutrition is the last step of the general process of assimilation, by which living bodies convert the materials which they derive from their food into substances like their own, and appropriate the materials thus changed to their own increase or repair. The several nutritive matters received into the living body are variously altered by digestion, absorption, respiration, and by all the other changes which the blood or other fluid undergoes in its passage to the several parts of the frame; these changes constitute the process of assimilation, at the end of which each part of the body abstracts from the general and homogeneous mass of nutritive fluid that which is required for its own growth or repair; muscle abstracting particles to form muscle, nerves from the same fluid abstracting particles to form nerve, and so on.

That a constant change of particles goes on in the majority of the tissues of the living body may be considered certain. It is evidently necessary from the nature of the case; for the living body is exposed to the same external agents as inorganic matter is, and all its own actions are so many more sources of waste to each tissue. Some constant power of repair must therefore be requisite to maintain living bodies in a state of integrity against these constant sources of waste; and that power is exerted in nutrition. Its influence is shown in the fact, that the living body retains throughout life, or a great portion of it, its form and composition less altered than the most solid of inorganic matters exposed to similar influences. Within certain limits also, the greater the waste, the greater the nutritive supply: thus, for example, by constant exercise the size of the muscles, so far from being decreased, is ultimately increased, the effect of nutrition being not only to replace that which was destroyed, but to supply a certain quantity more. We may clearly observe an application of the same law in the cuticle; that in the palm of the hand is more than twice as thick as that on the back of the arm, yet the former is subject to the most friction; and if the friction of the palm be greatly increased, the cuticle, notwithstanding the greater waste, increases in thickness in a yet greater proportion, so as to defend the subjacent skin from the greater source of injury to which it is exposed.

It is true that when the body does not change in any of its sensible qualities, we cannot be so well assured of any change of particles still going on; but we may reasonably assume that the two parts of nutrition, the removal of old and addition of new particles, which at other times we trace producing either an increase or decrease of the body, as one or the other of them predominates, are exactly balanced. If we examine, for example, the growth of any hollow organ of the body, as the heart, we find that in advancing years from childhood to manhood, it increases not only in its whole bulk, but also in the size of its cavities, and that, at every period of life, the size of the cavities and the thickness of their walls bear nearly the same proportion. Now, if only an addition were made to the exterior of the heart of a child, its whole bulk would be increased, but the size of its cavities would be disproportionately small. We must therefore assume that substance is removed from the inte-

rior of the heart, at the same time, though not in exactly the same quantity, that substance is added to its exterior. In like manner, when the heart diminishes in size, as it usually does in persons labouring under consumption, material must be at the same time abstracted from the exterior, and, in rather a less proportion, added to the interior. Whatever of this kind is true of the larger organs must be equally so of the small ones; so long as they preserve the same form and proportions, no change of size can take place without the concurrence of the two processes of nutritive deposition and absorption; when the former preponderates, the part will increase in size—when the latter preponderates, it will diminish; the former, when connected with disease, is named Hypertrophy [HYPERTROPHY], the latter Atrophy. [ATROPHY.]

The coincidence of these two processes, where any change of size takes place, being thus proved, and their continuance, when no such visible change occurs, being necessary, we may fairly assume that in the latter case, in the state of nutritive equilibrium, they still continue, though their opposite effects being exactly balanced, the ultimate result is not discernible. Popular belief, adopting this idea as one of whose truth there could be no possible doubt, has even assigned the periods of time in which one whole set of particles is removed and replaced. There is no evidence whatever upon which any such calculation can be made; the period in which an entire change is completed probably varies greatly in different tissues and different external circumstances, and in the bones and teeth it is probable that the particles once deposited are never removed, so long as the animal's size and other characters remain unaltered.

The process of nutrition is concerned in the production of two apparently different results—that of development and that of growth. In development the added particles not merely increase the size of the part, but produce a change in its form or its substance. Thus, the whole body, with all its varieties of tissues, and through all its changes of form, is *developed* by nutrition, from a small part of a little sac [Fœtus], which, to all appearance, is composed of homogeneous materials. In *growth* each part increases by the predominant deposition of particles within and around those of which it was previously composed, and similar to them. These two nutritive processes, though in the period of life previous to the adult age they are usually concurrent, may go on independently of each other. Thus the body may be deficient in development, some part of it being monstrous, that is, remaining of the same form as that which it had in the embryonic state [MONSTER], and yet with this defect in form it may increase in size, for monsters are commonly well-grown; and, on the other hand, being perfect in development and form, the body, or some part of it, may be deficient in size. A dwarf is an example of a defect of growth; a hare-lip, a cleft palate, an anormal unossified cartilage, are examples of defects of development: both are defects in the process of nutrition, but the failure is in each in a different direction.

One of the most important facts regarding the process of nutrition is that lately discovered by Dr. Schwann of Berlin (*Mikrosk. Untersuch. über die Uebereinstimmung der Thiere und Pflanzen*), that all the tissues of the body, however different in their fully developed state, yet originate from the same fundamental forms, and up to a certain period of their development pass through the same series of changes. He has shown that the law of development from cells, which Schleiden had proved to obtain in the formation of all vegetable tissues (*Beiträge zur Phylogenesis*, Müll. Arch., 1838), holds with equal truth in all the animal tissues, and thus that in their first periods of existence all organised structures follow the same laws of formation. The great principle of formation is briefly this:—from a living but amorphous substance, to which the name of cyto-blastema is given, minute roundish corpuscles first form. Around each of these a layer of organic substance, being after a time deposited and becoming membranous, forms a spherical or elliptical cell enclosing the corpuscle in or upon its wall. Around or rather upon this cell, a second cell next forms in the same manner as the first had, and to a part of its walls the first cell remains attached, and forms what is named the nucleus of the cell. These cells, containing nuclei, which again enclose one or more corpuscles, may be regarded as the original forms of which all the solid parts of the body are composed, or from which, altered according to various but certain laws, they are all produced. As e-

amples of such primary cells in their simplest form and separate, we find in the animal body the blood-globules, which float in a quantity of fluid cytoplasmata. Nearly similar cells with nuclei are found, forming membranes, with scarcely any intervening substance, in the horny tissues, as the cuticle, nails, feathers, &c., in which moreover each cell presents evidence of vitality to a certain degree independent of the rest of the body, inasmuch as they undergo various changes of form, flattening, enlarging, and splitting into fibres, after their first formation. In the next stage, the cells are separated by a larger quantity of intervening substance, with which their walls become amalgamated, as in the cartilages, bones, and teeth, in which such primary cells constitute the peculiar corpuscles by which those tissues have been long distinguished, and the intervening substance, which forms the greater part of the tissue, is analogous to the soft or fluid cytoplasmata of other parts. In these tissues also, the cells begin to acquire some peculiarities of form, sending out branched canals from their sides in a star-like manner, and becoming elongated. In the next degree similar cells, existing in the early periods of the tissue, acquire in the course of its development more peculiar forms, lengthening into the form of fibres and then splitting up into bundles of filaments, so as to form the fasciculi of cellular tissue, tendons, and elastic tissue, which remain connected by a very small quantity of the amorphous cytoplasmata. Lastly, instead of each cell lengthening and splitting into fibres, we find a number of cells arranging themselves in rows and adhering together, till, by the absorption of their attached membranous walls, their cavities open into each other and form a continuous hollow tube. Thus they form a kind of elongated secondary cell, which, continuing to grow in length and having peculiar substances deposited in its interior, acquires the characters of the fibres of peculiar tissues, as of the muscles or the nerves. In other cases each cell elongates and branches, and becomes connected with others which like it retain their cavities, so as to form together a series of tubes in the form of a network, which thus make up the capillary blood-vessels.

Each tissue thus formed from a series of cells increases in size, either by the increase of its primary cells or the elementary forms developed from them, by the interstitial deposition of particles within their tissue or in their cavities, or it grows by the formation of new cells within the tissue interposed between those previously existing, or (though very rarely in the animal body) by the development of young cells within the older ones.

The material of nutrition is in animals obtained from the arterial blood, which is constantly sent in the vessels distributed amongst or near the elementary structures of each tissue; but the proper act of nutrition is performed not by the power of the blood-vessels, as has been commonly supposed, but by the cells and the structures analogous to them, which convert the common nutritive matter drawn from the blood into their own proper tissue. The blood-vessels are only the conveyers of the materials for nutrition, and the difference commonly made between growth by intussusception, or deposition within the tissue of a part, and growth by apposition, or deposition on the surface of a part, is more apparent than real. The parts that are said to grow by apposition are those in which vessels do not run through the very substance of the tissue, but only on one side of it, as the cuticle, the vessels for the nutrition of which run in the subjacent skin. In these the formation of cells from the nutritive matter poured out from the blood-vessels can only take place on the surface of the skin, though they may undergo various changes when removed to a short distance by fresh depositions beneath them. In vascular parts, on the other hand, the nutritive matter is effused in all the interstices of the net-work of their blood-vessels, and therefore in all parts of the interior of the tissue; but here also the development of the nutritive matter must take place in layers concentric with the blood-vessel from which it was poured out, and therefore by *apposition*, though, with reference to the mass of the organ or tissue, it seems to be a growth by intussusception. The formation of fresh cells is therefore always by apposition on those already existing; but the cells and the elementary tissues immediately developed from them increase by intussusception, that is, by particles being deposited in the interspaces of those already existing, or in the cavities which the membranes of the cells already formed surround.

Thus the process of organic nutrition is widely different

from that by which inorganic masses increase in size, as in crystallization, which, as in it alone inorganic matter acquires definite form as it increases, can alone be compared with organic growth. In crystallization the addition of similar particles is entirely by external apposition, and the crystal has no power of attracting the particles of any matter different from its own: organic particles (as cells), on the contrary, not only attract particles into their interior spaces, but alter them on their passage, decomposing them from their previous elementary composition, and recombining them into matter like their own.

In healthy nutrition each part appropriates particles similar to its own, or differing according to certain laws of development; in disease, parts frequently appropriate other substances than their own, and all the solid products of various diseases may be regarded as the effects of morbid processes of nutrition. Some of these are formed according to the laws of normal development, and are only morbid because out of place, as cicatrices, adhesions, and the other similar products of simple inflammation; others are produced by the deposition of substances different from any of those already existing in the body, as in the production of various tumours. The former are composed of a tissue similar to cellular tissue, but the injuries of parts are but partially repaired by it, because the new tissue, which is in all cases nearly the same, differs in many of its characters from that which it replaces.

The most complete exercise of the process of nutrition in repairing injuries, whether from accident or disease, is exhibited in the regeneration of parts, but in man and the higher animals there are but few examples of a perfect reproduction of the injured or destroyed tissue. The bones and the non-vascular tissues are probably the only instances in which a tissue destroyed by disease or internal injury is replaced by one similar to itself.

In all these cases of repair or regeneration of tissue, the same process of the effusion of nutritive matter and the several stages of formation and alteration of the cells, is gone through which is observed in the first development of the tissues. But the process fails before the higher changes are accomplished, and the repairing tissue acquires only a low degree of development. As far also as they have been at present examined, the various morbid growths appear to be formed on a similar plan, and to proceed from a formation of primary cells.

NUTTALITE, a mineral which occurs crystallized. Primary form a square prism. Cleavage parallel to the lateral planes. Fracture uneven. Hardness 4.0 to 4.5. Colour grey. Lustre vitreous. Translucent. Specific gravity 2.7 to 2.8.

It is found at Bolton in Massachusetts imbedded in calcareous spar. Analysis by Thomson—

Silica	.	.	.	37.81
Alumina	.	.	.	25.10
Lime	.	.	.	18.33
Potash	.	.	.	7.30
Protoxide of Iron	.	.	.	7.89
Water	.	.	.	1.50

97.93

NUWAYRI is the patronymic of a celebrated Arabian historian of the eighth century of the Hejira, whose complete name was Ahmed Ibn Abd-al-wahhab Al-bekri Al-teymi Al-kindi, and who was further distinguished by the honourable surname of *Shehabu-d-din* (bright star of religion). He was born at Nuwayreh, a small town of the province of Bahnassá in Egypt, in the year 682 of the Hejira (A.D. 1283-4). Nuwayri distinguished himself as a theologian of the sect of Sháfe'i, and also as a rhetorician and grammarian, and he wrote several works on these subjects, the titles of which have not reached us. But the work which has made Nuwayri known among European scholars is his '*Neháyetu-l-árab fi fonúni-l-adab*.' It is a sort of cyclopædia, consisting of thirty books or volumes, and divided into five *fenn* (subjects), each of which is further subdivided into *hasm* (sections), containing each a certain number of *bab* (chapters). The first four *fenn* treat of the physical sciences and the several branches of natural history and moral philosophy. The fifth and last, which is likewise the most valuable for Europeans, is wholly occupied with a history of the Mohammedan settlements both in the east and west. The sixth *bab* (chapter) of the same contains a

narrative of the conquest of Africa, Spain, and Sicily by the Saracens, together with a chronological history of the sultans of the family of Umeyyah, who filled the throne of Cordova from A.H. 138 to 428 (A.D. 755 to 1036), and a short account of the principal events of their reigns.

Nuwayri died, according to Haji Khalfah, in the year 732 of the Hejira, at the age of 50. Among his other accomplishments his biographers say that his hand-writing was very fine; indeed he seems to have made a trade of it, for Soyútti, in his 'History of Egypt' (Ar. MS. in the Brit. Mus., 7331, f. 127), says that he made eight transcripts of the large collection of Mohammedan traditions, by Bokhari, entitled 'Sahih,' for each of which he was paid the enormous sum of one thousand dirhems, or about sixty-five pounds sterling. He dedicated his large work to Almalek An-nasser Kalaun, sultan of Egypt (reigned from A.H. 678 to 689), a liberal patron of letters, by whom he was munificently rewarded.

Complete copies of Nuwayri's work are exceedingly scarce. We are however assured that it is entire in the library of the university of Leyden. The Escurial library possesses one volume, containing parts xi. and xii. (*Catal.*, No. 1637.) There are also several loose volumes at Paris belonging to different sets, and among them one supposed to have been written by Nuwayri himself. (*Bib. Reg. Pari. Cat.*, No. 702.)

Various extracts from the work of Nuwayri have been published at different periods. Reiske was the first who mentioned the work, in his 'Prodigmata ad Hagi Khalifæ Tabulas,' Leyden, 1766. Albert Schultens next gave a slight notice of the historical part of his work, together with a few extracts from it, at the end of his 'Monumenta Vetustiora Arabum,' published at Leyden, in 1740. Again, in 1786, Reiske made use of it for his 'Historical Notes,' published as a continuation to his translation of Abû-l-fedâ (Hafnî, 1789-94). Schultens published also a Latin translation of some fragments of Nuwayri in the collection entitled 'Historia Vetustissimi Imperii Joctanidarum in Arabia Felice.' That chapter of the fifth *fenn* which treats of the conquest of Sicily by the Mohammedans was next translated, first into Latin, by Rosario Gregorio, and printed in folio at Palermo, 1790, and inserted in the collection entitled 'Rerum Arabicarum quæ ad Historiam Siculam spectant, amplissima collectio,' and then into French, by Mr. J. J. A. Caussin; and Mr. James Lassen Rasmussen has lately published, in his 'Additamenta ad Historiam Arabum ante Islamismum,' Copenh., 1821, some fragments of the same work, in Arabic and Latin, respecting some curious customs of the Arabs who preceded Mohammed.

Notwithstanding all this, Nuwayri's work is still imperfectly known, and it is to be regretted that the historical part—at least that concerning the settlements of the Arabs on the continent of Europe—has not been published entire, as it would throw great light on the history of the middle ages.

Haji Khalfah's *Kashfu-dh-dhunûn*, a bibliographical dictionary, in the British Museum; At-soyútti's *History of Egypt*, ib.; *Bib. Rich.*, No. 7331, fol. 70, v. *et passim*.

NUX VOMICA. [STRYCHNOS.]

NYCTALOPIA. [HEMERALOPUS.]

NYCTERIS. [CHEIROPTERA, vol. vii., p. 24.]

NYCTHEMERUS. [PAVONIDÆ.]

NYCTIA. [OWLS.]

NYCTIBIUS, M. Vieillot's name for a genus of birds, the type of which is the *Great Ibijau*, the *Grand Crapaud volant de Cayenne* of Buffon, *Caprimulgus grandis* of Latham.

**Generic Character.**—Bill very much depressed and dilated, especially at the base, where it is furnished with bristles, narrowed and hooked at the point; upper mandible with an obtuse tooth on each edge, towards its origin, very much developed in the old bird; lower mandible larger, with the edges curved outwards; gape very wide, reaching to the eyes; anterior toes united at the origin by a small membrane; lateral toes unequal; hallux robust and flattened. First quill shorter than the fifth.

**Description of the Great Ibijau.**—Size about that of a stout owl; total length of the bird rather more than twelve inches; of the bill, taken from the corners of the mouth, rather more than three; tail a little graduated, and exceeded by the wings when folded by a few lines; plumage brown, speckled with black, fulvous, and white, principally upon the back, wings, and tail; breast of a deeper brown

than the spots; head, neck, and lower part of the body striped transversely with the same colours. In some individuals the plumage is more brown than it is in others.

**Habits**, solitary. The bird haunts hollow trees, and prefers those which are near the water. [NIGHT-JARS.]



*Nyctibius grandis.*

NYCTICE'BUS. [SLOW LEMUR.]

NYCTICORAX, Mr. Stephens's name for a genus of *Grallatores*, or *Wading Birds*, belonging to the family *Ardeæ* (Herons and Cranes). Mr. Swainson has changed the name to *Nyctiardea*; but besides the inconvenience arising from the change, the generic name *Nyctiardea* is a hybrid word derived from Greek and Latin roots, and therefore objectionable.

**Generic Character.**—Bill very strong, rather longer than the head, compressed; upper mandible curved towards the point; maxilla sulcated for three-fourths of its length and emarginated; culmen rounded; tomia of both mandibles straight and sharp, that of the under mandible entering within the upper one. *Nostrils* basal, longitudinal, placed in the furrow of the maxilla, and covered above by a naked membrane; lores and orbits naked. *Legs* of mean length, slender. *Toes* three before and one behind; middle toe shorter than the tarsus, exterior toe connected by a membrane to the middle one as far as the first joint. *Claws* short, falcated, that of the middle toe pectinated. *Tibia* naked for a short space above the tarsal joint. (Gould.)

This form, of which at least seven species are now known, is widely diffused. Species occur in Europe, Asia, Africa, and America; and have been found in Manilla, New South Wales, and Tierra del Fuego.

We select as our example *Nycticorax Europæus*, Stephens; *Nycticorax Gardeni* Jard.; *Ardea Nycticorax*, Linn.

**Description.**—*Old Birds*—no difference in that stage of life between the sexes. Top of the head, back and scapulars, black with bluish and greenish reflections; three white very narrow feathers, six or seven inches in length, taking their origin at the back of the head just above the nape, and descending backwards; lower part of the back, wings, and tail clear ash-colour; forehead, space above eyes, throat, front of the neck, and lower parts white.



black, yellowish at the base of the lower mandible; iris red; feet yellowish green; length rather more than 1 foot 8 inches.

**Young of the Year.**—The three long nuchal feathers absent; top of the head, nape, back, and scapulars of a muddy brown, with longitudinal bright red dashes on the centre of each feather; throat white, with small brown spots; feathers of the front and sides of the neck yellowish, with wide brown borders; coverts of the wings and quills ashy-brown, marked with great yellowish white spots at the extremity of each feather; lower parts clouded with brown, white, and ash-colour; middle of the belly whitish; *arête* and point of the bill brown, the rest greenish yellow; iris brown; feet olive brown.

In this stage it is the *Ardea maculata*, and *Ardea Gardeni*, Gmel.; *Le Pouacre* and *Le Pouacre de Cayenne*, Buff.; *Spotted* and *Gardenian Heron*, Lath.; and *Scarza cenerino*, 'Stor. degl. Uc.' Indeed ornithologists have described it as a distinct species, in almost every progressive stage of plumage.

In the old state the bird is the *Bihoureau*, *Roupeau*, and *Heron gris* of the French; *Scarza Niticora* of the Italians; *Der Nacht-Reiher* and *Aschgrau Reiger mit 3-nacken federn* of the Germans; *Blaauwehuak* of the Netherlands; *Night-Heron* and *Lesser Ash-coloured Heron* of the British.

**Habits, Food, Reproduction, &c.**—The *Common Night-Heron* appears to affect high situations by day, and in the evening resorts to the low-lands, marsh, or river side for its food, which consists of fish, for choice, and in their absence of frogs, mice, and even insects. The old French quatrain says:—

'Le Bihoureau espèce de Heron  
Es haults rochers et es collines hante.  
Sa forme est peu au Heron differente.  
Sus le rivage il vit, et environ.'

The general truth of this picture of its habits is borne out by modern observation; and its fondness for perching on high situations is attested by Mr. Gould, who received a fine adult specimen which had been shot from a high tree in the gardens at Frogmore near Windsor. The nest is built of sticks on the topmost branches of trees, and the bird breeds, like the *Common Heron*, in society. Where there are no woods, the nest has been found among reeds. The eggs, four in number, are pale greenish blue.

**Geographical Distribution**—very wide. Since the article *BITTERN* was written, the Prince of Musignano has corrected the statement of its identity with the *Qua Bird*, which he notes as distinct, in his *Geographical and Comparative List*, under the name of *Nycticorax Americanus*, Bonap., *Ardea Nycticorax*, Wils. In addition to the localities given in the article above quoted, Col. Sykes notices it among the collection of birds' skins formed at the Cape of Good Hope by Captain Spiller, R.A. (*Zool. Proc.*, 1835.) It will be observed in the article *BITTERN*, that Le Vaillant had previously noticed it in South Africa. Mr. Gould records it, among other localities, from North Africa. Dr. Von Seebold and M. Bürger saw it in Japan. M. Lesson states that he found it at the Falkland Islands (Isles Malouines).

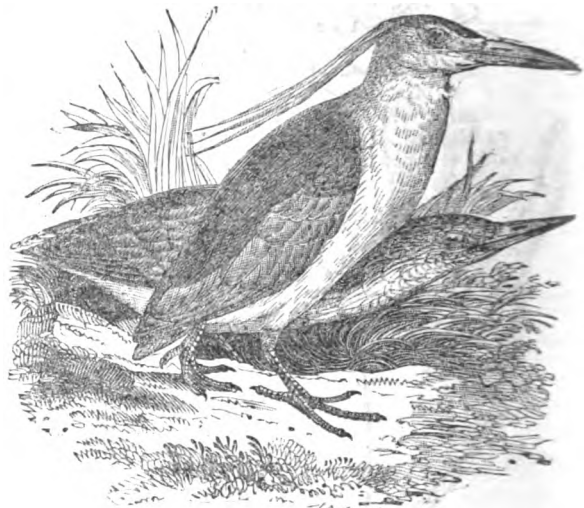
In Europe, M. Temminck notes it as rather abundant in most of the southern countries, but as more rare towards the north; and as not numerous in Holland. He considers the bird found in North America as the same species; but in this, it seems, he is mistaken.

In these islands the common Night-Heron is a rare visitor. In the last editions of Pennant, the specimen in the Leverian Museum, which was shot near London, is noticed, and the editor had heard of another having been killed in Suffolk; and Dr. Latham, in a note to the same work, records one that was killed at Cliefden in Buckinghamshire. He adds, that it is common in Spain and about Gibraltar, and that it inhabits China and India; and falls into the general error, as it now seems to be considered,\* that the North American species is identical with it.

Montagu notices a specimen shot on the Ouse near Ampthill, and another (a young bird—*Gardenian Heron*) was shot near Thame in Oxfordshire, by Lord Kirkwall. Be-

\* Mr. Gould appears still to entertain doubts whether this bird and the North American species are not the same; for, in his magnificent work on the 'Birds of Europe,' he says, 'if not identical, the Night-Heron of North America bears so great a resemblance to the European bird, as to require an experienced eye to detect the difference; the American birds are however, we believe, larger in all their proportions.' Latham, on the contrary, says that the American birds are smaller.

wick took his figure from a specimen in the *Wycliffe Museum*. Two came under the observation of Mr. Selby: one shot by the earl of Home, at the *Hirsel*, near Colstream, in 1823; and another, now in Sir W. Jardine's museum, killed about two years afterwards in the neighbourhood of Dumfries. It appears in Mr. Thompson's *Iris List*. He saw a specimen in Dublin, which, he was informed, was sent to the bird preserver, in whose possession it was in a fresh state, from Letterkenny, early in 1834.



Common Night-Heron.

Front figure, adult; back figure, young.

NYCTINOMUS. [CHEIROPTERA, vol. vii., p. 24.]

NYCTIORNIS. [MEROPIDÆ, vol. xv., p. 118.]

NYCTIPETES. [OWLS.]

NYCTOPHILUS. [CHEIROPTERA, vol. vii., p. 24.]

NYKÖPING. [SWEDEN.]

NYL GHAU, or NEEL GHAU. [ANTELOPE, vol. ii., p. 76.]

NYMEGEN. [NIMWEGEN.]

NYMPHÆACEA, Lamarck's name for a family of Dimyarian conchifers, consisting of the genera *Sanguinaria*, *Psammobia*, *Psammotea*, *Tellina*, *Tellinides*, *Corbis*, *Lucina*, *Donax*, *Capsa*, and *Crassina*. To these Mr. G. B. Sowerby suggests that *Gratelupia* and *Egeria* may be added. [CONCHACEA; CONCHIFERA; GRATELUPIA; MALACOLGY, vol. xiv., p. 319 (*Nymphidae*).]

NYMPHÆACEÆ, a natural order of aquatic plants, with floating leaves and solitary flowers, found in all the hot and temperate parts of the world. They usually have four sepals and many petals, which later gradually contract into stamens, indefinite in number, and either hypogynous or adherent to the sides of the carpels. The ovary is superior, divided internally into numerous cells, to whose sides adhere many seeds, containing an abundance of albumen and a small embryo external to it: the stigmas radiate from the apex of the ovary. The order differs from Ranunculaceæ in the consolidation of its carpels, from Papaveraceæ in the placentation not being parietal, and from Nelumbiaceæ in the want of a large truncated disk containing monospermous achenia. The stems of these plants are fleshy rhizomata, rooting in the mud at the bottom of the waters in which they grow; and their woody tissue is so loosely disposed among the cellular, as to have given rise to a controversy concerning the real nature of the plan on which it is arranged, most writers considering, with us, that it is Exogenous, while others refer it to the Endogenous type. The species of this order are generally plants of great beauty, either the flowers or the leaves being of unusual size. The white water-lily (*Nymphaea alba*) and the yellow (*N. luteum*) of our own rivers and ponds are among the finest specimens of floral development in these latitudes; in other countries both their size and colour are augmented, brilliant tints of blue and crimson being added to the pure white of our native species, and the most delicious odour being also emitted. In Demerara grows the *Victoria regia*, whose flowers have a diameter of fifteen inches, while the leaves are as much as six feet and a half across. (*Penny Magazine*, vol. vii., p. 20; and *Botanical Register* for 1836, Miscell., No. 13.) In the East Indies the *Euryale ferox*

emulates the *Victoria* in the size of the leaves, but its flowers are small and inconspicuous. In both these plants the farinaceous seeds are used for food.



*Nymphaea alba.*

1, the ovary, on which are seen the scars left by the petals and stamens removed from it; 2, a seed.

#### NYMPHICUS. [PSITTACIDÆ.]

NYMPHODORUS, a surgeon, whose date is not exactly known, but who must have lived some time before Christ. He is mentioned by several antient authors as the inventor of a machine for reducing luxations of the femur (Cels., *De Med.*, lib. viii., cap. 20; Gal., *Comment. in Hippocr. de Artic. Libr.*, tom. xviii., pars i., p. 736, ed. Kühn), and also of a sort of box (γλωσσοκομειον) for fractures of the limbs (Orbas., *De Machinam.*, cap. 24). He is probably the same person as Nymphodotus mentioned by Aetius (*Tetrab.* iii., Serm. i., cap. 45, 49), Paulus Ægineta (lib. vii., cap. 12), and Galen (*De Composit. Medicam. per Genera*, lib. vi., cap. 14, tom. xiii., p. 926, ed. Kühn).

NYMPHS (Νύμφαι, *Nymphæ*) were female deities in the Greek and Roman mythology, who were supposed to preside over all parts of the earth. Those who presided over rivers, brooks, and springs, were called *Naiads*; those over mountains, *Oreades*; those over woods and trees, *Dryades* and *Hamadryades*; those over the sea, *Nereids*; those over valleys, *Napææ*, &c. They are represented as beautiful young women; and indeed their name, which is probably connected with the Latin *nubo*, appears to have signified originally marriageable young women. They were the attendants of Hera, Aphrodite, Artemis, and other of the goddesses; and the nurses of many of the gods, as Zeus, Dionysus, and Pan. Their lives were very long, but they were not immortal. (Paus., x. 31, sec. 2.) They were

worshiped in many parts of Greece, and were propitiated by offerings of milk, oil, and honey, and by sacrifices of lambs (Theocr., *Id.*, v. 53, 149); and temples were also dedicated to them in Italy. (Cic., *De Nat. Deor.*, iii. 17.) [NAIADS; NEREIDS.]

NYSSO'NIDÆ, a family of Hymenopterous insects belonging to the section Fossiores. This family is thus characterised by Latreille:—Labium either entirely or for the most part hidden; the maxillæ and labium do not form a proboscis; mandibles without any internal notch; head moderately large; abdomen either conical or somewhat ovate, and with a short peduncle; antennæ filiform, with the first joint but slightly elongated.

The principal character which distinguishes this family from its congeners is the absence of a notch on the inner side of the mandibles. It contains the following genera:—*Astata*, *Nysson*, *Oxybelus*, *Nitela*, and *Pison*.

In the first of these genera, *Astata* of Latreille, the eyes are large and of an oval form, converging at the vertex, and in the male sex meeting; the mandibles are bifid at the apex: the anterior pair of wings have one narrow, short, and appendiculated marginal cell, and three submarginal cells, of which the first is narrow, longitudinal, divided obliquely near the middle by an obsolete nervure that runs from the base of the stigma to the middle of the first transverso-cubital; the second submarginal cell is triangular, and receives both the recurrent nervures; the third is very distant from the apex of the wing; the legs are moderately long and very spinous in the female.

*Astata boops* (Schrank) is about half an inch in length; the head, thorax, and legs are black, and the body is red, with a black tip and a small spot of black at the base. This species is found in various parts of England and on the Continent, but appears to be local. The female builds her nest in the ground, and is said to select the burrow formed by some other insect for the purpose. Mr. Shuckard, in his excellent work on the British Fossorial Hymenoptera, states that the males are much more abundant than the females; and whenever he succeeded in capturing the latter with its prey, he always found it to consist of the larvæ of *Pentatoma bidens*. Mr. Curtis has captured specimens laden with the larvæ of *Pentatoma prasina*, and a little bee (*Epeolus variegatus*) is preyed upon by the *Astata* to feed her larvæ.

In the genus *Nysson* (Latreille) the anterior wing has three submarginal cells; the second cell receives both recurrent nervures and is petiolated; the first submarginal cell is considerably longer than the two others; the mandibles are terminated by a simple point; the eyes are oval and prominent. Five species of this genus are recorded as British.

The genus *Oxybelus* (Latreille) is distinguished by the eye being oval and slightly prominent; the antennæ short and arcuated; the anterior pair of wings have a narrow marginal cell slightly appendiculated, and one submarginal cell, which receives a single recurrent nervure; abdomen short. Eight species of this genus are described in Mr. Shuckard's work: the most common is the *Oxybelus uniglutinis*, an insect about a quarter of an inch in length; black, with a row of white spots on each side of the abdomen, and with the tibiæ and tarsi red. It preys upon flies, which it carries by its hind legs to deposit in the burrow in which the young are reared.

The genus *Nitela* (Latreille) differs from the last in having the antennæ longer and nearly straight, and with the second and third joints of equal length. Like *Oxybelus*, it has but one submarginal cell; the mandibles are bifid at the apex; there are no protuberances on the thorax, nor spines on the legs.

In the genus *Pison* (Spinola) the eyes are emarginated; there are three submarginal cells to the anterior pair of wings; the second cell is very small, petiolated, and receives two recurrent nervures.

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O, in the vowel series, if arranged according to the nature of the sound, occupies the position between *a* and *u*. In the hieroglyphical characters it appears, according to Champollion, to have been a picture of an eye, and even in the old Greek alphabet it is occasionally found with a dot in the centre, to represent the pupil, for instance in the Elean Tablet. But for the different forms of the letter see ALPHABET. The changes to which this vowel is liable are numerous.

It is convertible with the adjoining vowel *u*; and indeed the two characters seem to have had a common origin. Thus, the old Greek alphabet would appear to have once terminated, like the Hebrew, with *tau*, so as to exclude the *upsilon*; whereas the Etruscans had a *u* but no *o*. Hence the predominance of the *o* in Greek, of the *u* in Latin. Within the limits of the Latin itself the two letters are often interchanged, out of which arises the confusion between the second, or *o*, and the fourth, or *u* declension, to both of which belong *ficus*, *cibus*, *senatus*, *tumultus*, *ornatus*, *laurus*, *domus*, &c. The words *consul* and *consulere* also appear as *cosol* and *cosolere*, and they have both a common root with *solum*, a seat. The English language, too, has often an *o* written where *u* is heard, as *one*, *none*, *once*, *come*, *done*, *won*, *some*.

2. With *a*. Grimm has pointed out this change as existing between the Latin and Teutonic tongues, as *doma-re*, *longus*, *odium*, &c., compared with *zähm-en*, *lang*, *hass*, &c. Hence too the double form of the name *Longobardi* and *Langobardi*. So, in Latin, from the root *gno* (*gnosco*) were formed *gnarus* and *ignarus*; and again, from these *narrare* and *ignorare*, in the latter of which the original vowel reappears. Again, with *clarus* is connected *gloria*, as closely as *gratia* with *gratus*. It is probable too that the masculine *bono* and the feminine *bona* were mere dialectic varieties which originally had no distinction of gender. Thus in the Gothic the converse prevails, the forms in *o* being feminine, those in *a* masculine. Lastly, the English and Scotch have many instances of the interchange, as *one*, *two*, *stone*, in the one, *ane*, *twa*, *stane*, in the other; but perhaps this change belongs to the next head.

3. With the long *ē*, the sound of which must be considered as the same with the English *a*. Hence in Greek, *εὐπατωρ*, *ἀπατωρ*, &c., from *πατηρ*; and the Latin *sol* *cor* correspond with the Greek *ἥλιος* and *ἥρ* (observe too the German *herz*). The town *Nemētum* in Gallia is called by Greek geographers *Νεμῶσσος*, and the German *jener* is in English *yon*.

4. With *ou*. This interchange is virtually the same with the first-mentioned. It is not uncommon in French, as compared with Latin, as *novella*, *nouvelle*; *rota*, *roue*; *totus*, *tout*, &c.

5. With *uo*, especially in Italian, as *huomo*, *buono*, *luogo*, *nuovo*, from the Latin *homo*, *bonus*, *locus*, *novus*.

6. With *eu*, in French, as *lieu*, *jeu*, *peu*, *leur*, *heure*, *douleur*, *queue*; from the Latin, *locus*, *focus*, *jocus*, *pāuci* (and Italian, *poco*), *illorum*, *hora*, *dolor*, *cauda* or *codu*.

7. With *au*. This exists within the Latin; as *cauda* and *coda*, *cautes* and *cotes*, *caudex* and *codex*, *Claudius* and *Clodius*, *plaudo* and *plodo*. So from the Latin *aurum*, *audere* (whence the frequentative *ausare*), *Aufidus*, *audire*, the Italians have *oro*, *osare*, *Ofunto*; and the French *or*, *oser*, *ouir*. Hence too the French pronunciation of the diphthong *au*.

8. With *oa*. Thus, the English words *boat*, *oath*, *oak*, must have received their present orthography when both the vowels were pronounced, as they still are in some parts of England, *bo-at*, *o-ath*, or *boo-at*, *oo-ath*.

9. With *ue*, as in Spanish *bueno*, *luego*, *fuego*, *huesped*; from the Latin *bonus*, *locus*, *focus*, *hospes*.

10. An initial *o* with *hue* or *hui*. Hence from the Latin *ostium*, *ostiarus*, are derived the French *huis*, *huissier*, and the English *usher*. From the Latin *os*, a bone, *ovum*, an egg, the Spaniards have *hueso*, *huevo*. From the Latin *octo*, *ostrea*, come the French *huict* or *huit*, *huître* or *huître*. From the Latin *hodie*, which appears to have been pronounced as the Italian *oggi*, was formed the French *hui*, in *au-jour-d'hui*.

11. In the paragraphs numbered 5, 9, and 10, the *o*

really takes the sound of the English *w*, or the Greek digamma; and the same is the case in the Greek language itself, as in *οἶκος*, *οἶνος*, *οἶδα*, *οἶκος* (which is the true reading in Herodotus, iv. 154), for *ῥοκος*, *ῥῥῖνος*, *ῥῥῖδα*, *ῥῥῖκος*; the first three of which may be compared with the Latin *vicus*, *vinum*, *video*. Closely allied hereto is the frequent interchange in Latin of *oe* or *oi* with *ū*. [U.]

12. With *ea*, as between German and English. Thus the former language has *strom*, *brot*, *gross*, *tod*, *drohen*; the latter *stream*, *bread*, *great*, *death*, *threaten*. This same change exists in the English by itself, as *cleave*, *clove*; *weave*, *wove*; *heal*, *whole*; *heat*, *hot*, &c.

13. With *ei*, pronounced as the English long *i*. This is exceedingly common in the same languages. Compare the German *beide*, *bein*, *ein*, *nein*, *geist*, *heim*, *heiss*, *kleiden*, *mazheit*, *meist*, *theit*, *heilig*, *reihe*, *speiche*, *zeichen*; with both *bone*, *one*, *none*, *ghost*, *home*, *hot*, *clothe*, *manhood*, *most*, *dole*, *holy*, *row*, *spoke* of a wheel, *token*. This change also exists within the English language, as *shine* and *shiner*; *strike* and *stroke*; *drive* and *drove*.

14. A short *ō* with a short *ē*. This is particularly common in Greek, and above all in the penult of dissyllables. Thus with *νεμω*, *στέλλω*, *λέγω*, there co-exist the substantive forms *νομος*, *στολος*, *λογος*. The Latin commonly prefers the *ō* in such words. Hence to the Greek *πεπρω*, *επρ*, *ενε* (*εννε*), *ναος* (*νε*), *εμεω* (*εμε*), correspond the Latin *cōquus* and *pōpina*, *ōb*, *nōvem*, *nōvus*, *vōmo*. The change of these vowels is exceedingly common when preceded by *r* sound, especially if an *r* or *i* follow. Hence in Latin, *verro* and *vorto*, *velle* and *vōlo*, *vester* and *voster*, *vēto* and *vōto*. Hence likewise to the Latin *vermis*, *vellus*, *verruca*, correspond the English *worm*, *wool*, *wart*. Again, the German *schwerdt* is in English *sword*; and *vice versa* the German *ant-wort* (as it were *anti-word*) is in English *answer*; and lastly, many words of this form are written with an *o* and pronounced with an *e*, as *wort*, *worm*, *wort*, *worse*.

15. For the tendency of the final letter *n* to disappear after *o*, see N.

OAK. [QUERCUS.]

OAK BARK. [BARK.]

OAKHAM. [RUTLANDSHIRE.]

OAKHAMPTON. [DEVONSHIRE.]

O'ASIS (in Greek, *ὄασις*, and sometimes *Ἀδασις*) is the appellation given to those fertile spots watered by springs and covered with verdure which are scattered about the great sandy deserts of Africa. [DESERT.] In Arabic they are called wadys. The Arabic and the Greek name seem to contain the same root, and possibly the word may be originally a native African term. The most noted are in the Libyan desert, namely, AUGILA, SIWAH, the great oasis west of Thebes, or El Khargeh, the little oasis, or Wah el Bahryeh, and several smaller ones which are noticed under EGYPT. Fezzan also may be considered as a great oasis of the Sahara. Hornemann has described Fezzan; Browne has given an account of the oasis of El Khargeh, and Cailliaud of the smaller oases west of Egypt.

The oases appear to be depressions in the table-land of Libya. On going from the Nile westward, the traveller gradually ascends till he arrives at the summit of an elevated plain, which continues nearly level, or with slight undulations, for a considerable distance, and rises higher on advancing towards the south. The oases are valleys sunk in this plain, and when you descend to one of them you find the level space or plain of the oasis similar to a portion of the valley of Egypt, surrounded by steep hills of limestone at some distance from the cultivated land. The low plain of the oasis is sandstone or clay, and from this last the water rises to the surface and fertilises the country; and as the table-land is higher in the latitude of Thebes than in that of lower Egypt, we may readily imagine that the water of the oases is conveyed from some elevated point to the south, and being retained by the bed of clay, rises to the surface wherever the limestone superstratum is removed. (Sir J. Gardner Wilkinson 'On the Nile, and the present and former Levels of Egypt,' in *Journal of the London Geographical Society*, 1839.) [OLYMPIODORUS.]

**OATES, TITUS**, was the son of a ribbon-weaver, who, having seceded from the Anabaptists, among whom he was a preacher, conformed to the doctrines of the English established church, took orders, and held a benefice. He was educated at Merchant Taylor's school in London, and at the university of Cambridge. Having received ordination, he became chaplain to the duke of Norfolk, who also settled him in a small living. (Hume.) He was subsequently accused of perjury, but he escaped conviction, and became chaplain in one of the king's ships, from which he was disgracefully expelled. Shortly after he embraced Roman Catholic doctrines, entered the College at St. Omer, and though more than 20 years of age, resided for some time among the students. On his return from a mission to Spain in 1677, the Jesuits, who were heartily tired of their convert, dismissed him from their seminary; and it is probable that resentment for this dismissal, combined with a prospect of gain, induced him to contrive the 'Popish Plot,' which alone has preserved his name from being forgotten.

In September, 1678, he made a disclosure before Sir Edmundbury Godfrey, a noted and active justice of the peace, and afterwards before the council and the House of Commons, to the effect 'that the pope felt himself entitled to the possession of England and Ireland on account of the heresy of prince and people, and had accordingly assumed the sovereignty of these kingdoms; that power to govern them had been delegated by the pope to the society of Jesuits, who, through Oliva, the general of their Order, had issued commissions appointing various persons whom they could trust to the chief offices of state, both civil and military. Lord Arundel, he said, was to be chancellor; Lord Powis, treasurer; Lord Bellasis, general of the papal army; Lord Stafford, paymaster; Sir William Godolphin, privy seal; and Coleman, secretary of state. All the dignities too of the church, he alleged to be newly appropriated, and many of them to Spaniards and other foreigners. Two men named Grove and Pickering, he declared, were hired to shoot the king, and that Sir George Wakeman, the queen's physician, had engaged to poison him, the queen herself being privy to the scheme. He also stated that the Roman Catholics were to rise in different districts of the kingdom, and that every means would be adopted for the extirpation of Protestantism.' His evidence was confirmed by two men named Tonge and Bedloe, especially the latter, a man of low extraction and bad reputation. (For Tonge see Evelyn's *Memoirs*, 8vo., vol. ii., p. 450; for Bedloe, Lingard, vol. xiii., p. 97, and Hume.) For the list of persons, both Jesuits and men of importance in this kingdom, who suffered imprisonment and execution through the accusations of Oates, we must refer to the general histories of the time.

Notwithstanding the almost universal credence which was given to him at the time, it has subsequently been placed beyond doubt that the plot which Oates pretended to reveal was an infamous and perjured fabrication. His circumstances, his character, the nature of his evidence, the manner of its production, not at one time but at several times, though he had previously professed to have told all that he knew, the mode in which the first disclosure was made, together with inconsistency and errors, evidently betray imposture. 'While in Spain he had been carried, he said, to Don John, who promised great assistance to the execution of the Roman Catholic designs. The king asked him what sort of a man Don John was? He answered, a tall, lean man; directly contrary to the truth, as the king well knew. He totally mistook the situation of the Jesuits' college at Paris. Though he pretended great intimacy with Coleman, he did not know him when placed very near him, and had no other excuse than that his sight was bad in candle-light.' He also fell into other errors. (Hume.) We mention these particular proofs of falsehood, but little reliance can be placed on the evidence of a man who, if his word was to be believed, had entered the Jesuits' society with the sole purpose of 'gaining their secrets in order to betray them.'

It may be urged, that the universal credit given to Oates's evidence at the time is a strong proof that his story was true. There are circumstances however which account for the ready belief with which his accusations were received, although they do not prove their truth.

The English Protestants had long apprehended an attempt on the part of the Roman Catholics to restore their religion and re-establish their power; and their anxiety on

this account had latterly been augmented in some degree by the conduct of the king, and in a still greater degree by the Duke of York's open profession of the old religion and his attachment to its adherents. Moreover there were immediately connected with Oates's disclosure two events giving it an apparent corroboration, which was eagerly assumed to be real by the feverish minds of contemporary partisans. The first of these was the sudden and violent death of Sir Edmundbury Godfrey, the magistrate who had taken Oates's depositions. No proofs could be adduced to show the manner of his death. Whether he committed suicide or was murdered has never been ascertained; but the fact that he had taken Oates's evidence, and had been active in searching out the supposed plot, was sufficient to convince the Protestants, excited as they then were, that he had been murdered by Roman Catholics, partly out of revenge and partly to aid the escape of their conspirators. The second apparent corroboration of Oates's evidence, which, though no real confirmation, had at the time an influence in maintaining its credibility, is, that it led to the discovery of a plot, though not such a plot as he disclosed. (Hallam, *Const. Hist.*, ii., p. 571.) Oates denounced Coleman, the secretary of the Duchess of York; and upon searching his house, there were found, among his correspondence with Père la Chaise, papers which proved a combination for the purpose of re-establishing Roman Catholicism in England. That it was a plot, that it was on the part of the Roman Catholics, and discovered through Oates, was sufficient in the then temper of Protestants to reflect credit on his disclosures, though Coleman's plans did not coincide with the schemes which Oates pretended to have discovered.

During the closing years of Charles II.'s reign, Oates was protected by the government, and received a pension of 1200*l.* a year. In the following reign, as might be expected, his enemies revenged themselves. The Duke of York had not long succeeded his brother on the throne, before Oates was tried and convicted of perjury, sentenced to imprisonment for life, and to be whipped and stand in the pillory at intervals. The punishment was so rigidly enforced, that Hume states it must have been the intention of the government that it should terminate his life; he lived however until William's reign, received a second pension of 400*l.* a year, and died at an advanced age. Grainger says that there have been published under his name, though for a clergyman he was an illiterate man, 'A Narrative of the Popish Plot;' 'The Merchandize of the Whore of Rome;' and 'Eikon Basilike, or a Picture of the late King James.' A full account of his evidence and the Popish plot is given by Rapin, and in the 'State Trials.' See also Hume, Lingard, Burnet, Evelyn, and Hallam's *Const. Hist.*

**OATH.** Oaths have been in use in all countries of which we have any exact information, and it is probable that there is no nation which has any clear notion of a Supreme Being, or of superior beings, that does not make use of oaths on certain solemn occasions. An oath may be described generally as an appeal or address to a superior being, by which the person making it engages to declare the truth on the occasion on which he takes the oath, or by which he promises to do something hereafter. The person who imposes or receives the oath, imposes or receives it on the supposition that the person making it apprehends some evil consequences to himself from the superior Being, if he should violate the oath. The person taking the oath may or may not fear such consequences, but the value of the oath in the eyes of him who receives or imposes it consists in the opinion which he has of its influence over the person taking it. An oath may be taken voluntarily, or it may be imposed on a person under certain circumstances by a political superior; or it may be the only condition on which the assertion or declaration of a person shall be admitted as evidence of any fact.

The form of taking the oath has varied greatly in different countries. Among the Greeks, a person sometimes placed his hand on the altar of the deity by whom he swore; but the forms of oaths were almost as various as the occasions. Oaths were often used in judicial proceedings among the Greeks. The *Dicastæ*, who were judges and jurymen, gave their verdict upon oath. The Heliastic oath is stated at length in the speech of Demosthenes against Timocrates (c. 36). It does not appear that the oath was always imposed on witnesses in judicial proceedings; and yet it appears that sometimes witnesses gave their evidence on oath: perhaps the oath on the part of witnesses was generally voluntary.

(Demosth., *Πρὸς Ἀφῶβον Ψευδ.*, c. 16; *Κατὰ Κόνωνα*, c. 10; and Meier and Schömann, *Att. Process.*, p. 675.)

In the Roman jurisprudence, an oath was required in some cases from the plaintiff or the defendant, or both. Thus the oath of calumny was required from the plaintiff, which was a solemn declaration that he did not prosecute his suit for any fraudulent or malicious purpose. The offence of false-swearing was *perjurium*, perjury; but it was considered a less offence in a party to a suit when the oath was imposed by a *judez* than when it was voluntary. It does not appear that in civil proceedings witnesses were necessarily examined on oath; but witnesses appear to have been examined on oath in the *judicia publica*, which were criminal proceedings. The title in the *Digest*, 'De Testibus' (22, tit. 5), makes no mention of the oath, though it speaks of punishment being inflicted on witnesses who bore false testimony.

The law of England, as a general rule, requires all evidence or testimony for judicial purposes to be given on oath, and all persons may be sworn as witnesses who, being questioned on the occasion of taking the oath, will declare their belief in the existence of God, in a future state of rewards and punishments, and who will further declare their belief that perjury will be punished by the Deity. This rule permits all persons, of all religious persuasions, who profess to have the necessary belief, to be sworn as witnesses; and it excludes all other persons from being witnesses. A Jew, a Mohammedan, and a Hindu may be sworn as witnesses, but they must severally take the oath in that form which is sanctioned by the usage of their country or nation, and which they severally consider to be binding. It follows that a person who professes atheism, or who does not profess such belief as is stated above, cannot be sworn, and consequently cannot be admitted to give testimony for judicial purposes. Children also who are too young to understand the nature of an oath, and adults who are too ignorant or too weak in intellect to understand what is meant by an oath, cannot be sworn as witnesses. The offence of declaring what is false, when a witness is examined upon oath, constitutes perjury: the particular circumstances which must concur in order that false-swearing shall be legal perjury are stated under that head. [PERJURY.]

Declarations made by a person under the apprehension of immediate death are generally admitted as evidence in judicial proceedings, when properly verified; for it is considered that the circumstances in which the person is placed at the time of making the declaration, furnish as strong motives for veracity as the obligation of an oath. Quakers also, in all civil cases, were allowed by the statute 7 and 8 Wm. III., c. 34, to give their evidence on affirmation; and now the affirmation of Quakers and Moravians is admissible in all judicial proceedings, both civil and criminal. When a defendant in chancery is entitled to privilege of peerage, or as a lord of parliament, he is required to give his answer to a bill upon honour only; and in the case of a corporation, the corporate body defendants put in their answer under their common seal. Other defendants are required to put in their answer upon oath. For other matters connected with judicial evidence see EVIDENCE.

An oath is required in England in a great many cases besides judicial proceedings, as for instance, on admission to places of public trust, and on a variety of other occasions. By an act of the 5 and 6 Wm. IV., c. 62, the lords of the Treasury are empowered to substitute a declaration in lieu of an oath, solemn affirmation, or affidavit, in a variety of cases, such as relate to the revenues of Customs or Excise, the Post Office, and other departments of administration mentioned in the second section of this act. This act also substitutes declarations in lieu of oaths, solemn affirmations, and affidavits, in various other cases enumerated in the act, for instance, where a person seeks to obtain a patent under the Great Seal. Justices of the peace and others are (s. 13) prohibited from administering or receiving oaths, affidavits, or solemn affirmations, touching any matter or thing whereof such justice or other person has not cognizance or jurisdiction by some statute in force at the time; with certain exceptions however, specified in the latter part of this section. The object of this section was to put an end to the practice of administering and receiving oaths and affidavits voluntarily made in matters not the subject of any judicial inquiry, nor in anywise pending or at issue before the person by whom such oaths or affidavits were administered or received. But this act does not extend or apply to cases

where the oath of allegiance then was or thereafter might be required to be taken by any person who may be appointed to any office; nor does it extend or apply to any oath, solemn affirmation, or affidavit, which then was or thereafter might be made or taken, or required to be made or taken, in any judicial proceeding, in any court of justice, or in any proceeding for or by way of summary conviction before any justice of the peace. (s. 7.) Persons who wilfully and corruptly make or subscribe any declaration, under the provisions of this act, knowing the same to be untrue in any material particular, are declared (s. 21) to be guilty of a misdemeanor. The statute of 1 and 2 Vic., c. 77, provides the same privilege of solemn affirmation for persons who have been Quakers or Moravians, and have ceased to be such, but still entertain conscientious objections to the taking of an oath as they would have enjoyed if they were still Quakers or Moravians.

As oaths may be either voluntary or may be imposed by a political superior, so they may be imposed either on extrajudicial or on judicial occasions. Oaths which are imposed on occasion of judicial proceedings are the most frequent in this country, and the occasions are the most important to the interests of society. The principle on which an oath is administered on judicial occasions is this: it is supposed that an additional security is thereby acquired for the veracity of him who takes the oath. Bentham, in his 'Rationale of Evidence,' on the contrary, affirms that 'whether principle or experience be regarded, the oath will be found, in the hands of justice, an altogether useless instrument; in the hands of injustice, a deplorably serviceable one; that it is inefficacious to all good purposes,' and 'that it is by no means inefficacious to bad ones.' As the policy of abolishing oaths has been a matter of some discussion, and is one of great importance, a few words on the subject may not be out of place.

The three great sanctions or securities for veracity in a witness, or, to speak perhaps more correctly, the three great sanctions against mendacity in a witness, are, the punishment legally imposed on a person who is convicted of false swearing, the punishment inflicted by public opinion or the positive morality of society, and the fear of punishment from the Deity in this world or the next, or in both. The common opinion is, that all the three sanctions operate on a witness, though they operate on different witnesses in very different degrees. A man who does not believe that the Deity will punish false swearing, can only be under the influence of the first two sanctions; and if his character is such that it cannot be made worse than it is, he may be under the influence of the first sanction only. Bentham affirms that the third sanction only appears to exercise an influence in any case, because it acts in conjunction with 'the two real and efficient sanctions,' 'the political sanction and the moral or popular sanction;' and that if it is stripped of those accompaniments, its impotence will appear immediately. This experiment of stripping cannot easily be made, but a little consideration may help us to a solution of the question in another way.

Bentham's chief argument is as follows: 'that the supposition of the efficiency of an oath is absurd in principle. It ascribes to man a power over his Maker. It supposes the Almighty to stand engaged, no matter how, but absolutely engaged, to inflict on every individual by whom the ceremony, after having been performed, has been profaned,—a punishment (no matter what) which, but for the ceremony and the profanation, he would not have inflicted. It supposes him thus prepared to inflict, at command, and at all times, a punishment, which, being at all times the same, at no time bears any proportion to the offence.' Again: 'either the ceremony causes punishment to be inflicted by the Deity, in cases where otherwise it would not have been inflicted; or it does not. In the former case, the same sort of authority is exercised by man over the Deity, as that which, in English law, is exercised over the judge by the legislator, or over the sheriff by the judge. In the latter case, the ceremony is a mere form without any useful effect whatever.'

The absurdity of this argument hardly needs to be exposed. He who administers the oath, by virtue of the power which he has to administer it, and the political superior who imposes the oath, may either believe or not believe that the Deity will punish false swearing, and it is quite immaterial to the question, which of the two opinions they entertain. That which gives the oath a value in the eyes

of him who administers it, or of that political superior who imposes it, is the opinion of the person who takes the oath; and if the individual who takes the oath believes that the Deity, in case it is profaned, will inflict a punishment which otherwise he would not inflict, the object of him who enforces the oath is accomplished, and an additional sanction against mendacity is secured. It matters not whether the Deity will punish or not, nor whether he who enforces the oath believes that he will punish or not: if he who takes the oath believes that the Deity will punish false swearing, that is sufficient to show that the oath is of itself a sanction.

The fear of legal punishment is admitted by Bentham to be a sanction against mendacity. But the legal punishment may or may not overtake the offender. Legal punishment may follow detection, but the perjury may not be detected, and therefore not punished. Is the oath, or would a declaration without oath be, 'a mere form without any useful effect whatever,' because the legal punishment may not and frequently does not overtake the offender? When a Greek or a Roman swore by his gods, in whose existence he believed, and who, being mere imaginations, could not punish him for his perjury, was not his belief in their existence and their power and willingness to punish perjury a sanction against mendacity? All antiquity at least thought so.

There are occasions on which oaths are treated lightly, on which he who imposes the oath, he who takes it, and the community who are witnesses to it, treat the violation of it as a trivial matter. Such occasions as these furnish Bentham with arguments against the efficacy of oaths on all occasions. Suppose we admit, with Bentham, as we do merely for the sake of the argument, that 'on some occasions oaths go with the English clergy for nothing;' and this, notwithstanding the fact, which nobody can doubt, 'that among the English clergy believers are more abundant than unbelievers.' The kind of oaths 'which go for nothing' are not mentioned by Bentham, but they may be conjectured. Now, if all oaths went for nothing with the clergy, or with any other body of men, the dispute would be settled. But this is not the fact. If in any way it has become the positive morality of any body of men that a certain kind of oath should go for nothing, each individual of that body, with respect to that kind of oath, has the opinion of his body. He does not believe that such oath, if broken, will bring on him divine punishment, and therefore such oath is an idle ceremony. But if there is any oath, the violation of which he thinks will bring on him divine punishment, his opinion as to that kind of oath is not at all affected by his opinion as to the other kind of oath. Now, oaths taken on judicial occasions are by the mass of mankind considered to be oaths of the latter kind, and therefore they have an influence on the great majority of those who take them. Whether society will in time so far improve as to render it safe to dispense with this ceremony in judicial proceedings, cannot be affirmed or denied; but a legislator who knows what man now is, will require better reasons for the abolition of judicial oaths than Bentham has given.

How far the requisition of an oath may be injurious in excluding testimony in certain cases, and how far oaths on solemn and important occasions may be made most efficacious, and in what cases it may be advisable to substitute declarations in lieu of oaths, are not matters of consideration here. It is enough here to show that an oath is a sanction or security to some extent, if the person who takes it fears divine punishment in case he should violate it; and that this, and no other, is the ground on which the oath is imposed.

Indeed it is evident that in English procedure the professed opinion or belief of the person who takes the oath is the only reason for which courts of justice either admit or refuse to receive his evidence; and this is shown by the questions which may be put to a witness when he comes to deliver his evidence in a court of justice.

There is some difficulty in stating accurately how far oaths were required from witnesses in Roman procedure under the republic and the earlier emperors. In addition to what has been stated, the reader may refer to Cicero, *Pro Q. Rosc. Comed.*, c. 15, &c.; Nooldt, *Op. Omn.*, ii. 479, 'De Testibus;' and to the commentary of Asconius on the Verrine Orations. By a constitution of Constantine, all witnesses were required to give their testimony on oath;

and this was again declared by a constitution of Justinian. (*Cod.* 4, tit. 20, s. 9, 16, 19.)

Many persons conscientiously object to the taking of an oath on religious grounds, and particularly with reference to our Saviour's prohibition (*Matth.*, v. 33). On the subject of oaths in general the reader may consult Grotius, *De Jure*, B. & P., lib. ii., c. 13; Paley's *Moral Philosophy*, Tyler's *Origin and History of Oaths*; the *Law Magazine*, vol. xii.; and the work of Bentham already referred to.

OATS (*Avena sativa*) is a well-known species of the genus *Avena*, a plant of the family of the Gramineæ, in the class Triandria Digynia of Linnæus. [AVENA.] We shall here only consider those varieties which are cultivated for their grain, principally as food for horses, and in some cases for men also, when ground into oatmeal or grits.

The great use of oats, and the ease with which they are raised on almost every kind of soil, from the heaviest loam to the lightest sand, have made them occupy a place in almost every rotation of crops. Before agriculture had been subjected to regular rules, the result of long experience, the land was often sown as long as any return could be obtained, before any means of recruiting it with manure were thought of; and the last crop which would return any increase of the seed was generally oats. After this the land, no longer repaying the labour of ploughing and sowing, was abandoned, till, by length of time and the decomposition of roots and weeds, some renewed fertility was produced. Of all the plants commonly cultivated in the field, oats seem to have the greatest power of drawing nourishment from the soil, and hence are justly considered as greatly exhausting the land. Some farmers on this account prefer buying all their oats in the market to raising them on their own land. Where the soil is well adapted to the growth of wheat and barley, which bear a better price, this may be a judicious plan; but as a general rule, it is always more profitable to raise oats for home consumption than to trust to a fluctuating market. With proper management, a crop of oats may give as great a profit on the best land as any other crop, when it is considered that it requires less manure and produces an abundance of straw, which is very fit for the winter food of horses and cattle, especially when aided by roots or other succulent food.

To make a crop of oats profitable, some attention must be paid to the preparation of the soil and to free it from weeds; for to sow oats on a foul wheat or barley stubble slightly turned in by the plough, as is sometimes done, is the reverse of good husbandry.

The best oats are raised in Scotland and in Friesland, and in both countries the land is carefully cultivated. In Scotland, oats are generally sown on a grass layer which has been in that state for some years, and sometimes on old pastures which are broken up for the purpose. The crops exceed in bulk and weight of grain all that the most sanguine person, unacquainted with the system, would expect, and in many seasons, not favourable for the wheat crop, oats are much more profitable. Wherever the land is not of a good quality, and wheat is apt to fail, oats are a much safer crop, especially in retentive soils, as rye is on poor sands.

When oats are sown after turnips, cabbages, or any other green crop, the land should be well ploughed, if the green crop was not consumed on the spot, and a moderate supply of manure will be well repaid by the increased produce. A heavy loam is best suited for oats: they require a certain degree of moisture, and a deep soil is very favourable to their growth. On land which has been trenched, or where the subsoil plough has been used, after careful draining, if required, oats will thrive wonderfully, without requiring so rich a soil as barley or wheat. The roots are hardier and have a stronger vegetative power. When once they have struck deep into the soil, a good crop, according to the quality of the land, may be relied on.

When oats are sown after artificial grasses, the land is seldom ploughed more than once, and the seed is sown on the fresh mould which has been turned up; but unless the land be very free from weeds, it would be better to plough the sward with a shallow furrow early in autumn. Before winter the scarifier would break the rotten sward, which might then be buried deep by another ploughing. The land would be ready for sowing early in spring, which is a great advantage, both as to the quality of the oat crop and the earlier harvest, especially in those districts where the latter part of the autumn is apt to be stormy and rainy. The land, if treated would be clean, and the fallow, which is a

sorted to, of necessity, after a crop of oats, might be dispensed with, as the weeds have been destroyed and buried deep.

When oats are sown on light land after turnips, which have been eaten by sheep folded on them, it may be ploughed with as shallow a furrow as will turn in the surface: the preparation for turnips will have sufficiently moved the soil; and the manure of the sheep should not be buried too deep. On poor moist land oats are more profitable than barley. Clover and grass seeds may be sown among them with equal advantage, as they will seldom grow so high as to be laid and smother the young clover; and barley is very apt to fail on land subject to retain the water.

In sowing oats more seed is often used than of any other grain, because, although the plants tiller where they have room, the straw of the second shoots is weaker, and the grain is not ripe so soon as that of the principal stem; but when the plants rise close and thick, there are no tillers, the main stem is stronger, and the corn is more plump and equal. Six bushels of oats are often sown on an acre; but if they are drilled, four bushels are sufficient, and when dibbled, which is sometimes the case in Norfolk and Suffolk, much less seed is used. A good preparation of the land is of more consequence than a superabundance of seed.

In a field where oats are sown broadcast, and covered by the harrows, many seeds remain exposed to the depredation of birds, which soon find them out at a time of the year when food is scarce; but when they are drilled or dibbled, all the seed is buried and germinates, without any loss. When the seed is sown and ploughed in, the same object is attained; but as the furrow must be shallow in order that the seed may not be buried too deep, the land must have been ploughed before to a considerable depth, unless it be after turnips fed off by sheep, in which case ploughing the seed in is a good practice: in either case four bushels of seed per acre is an ample allowance.

When the ground has been well prepared, there is no necessity for weeding or hoeing the crop as it advances; but if large weeds appear, such as charlock, May-weed, docks, or thistles, they must be carefully weeded out, or else the ground will be so infested with their seeds or roots that it will be difficult to eradicate them afterwards. Oats, when fully ripe, are very apt to shed, and many are lost for want of attention. As soon as the straw turns yellow under the panicle, the oats should be reaped, however green the lower part of the straw may be: the straw will be better fodder for cattle, and all the corn will be saved. Oats are generally mown with a scythe, and raked into heaps to dry like hay; but this is a wasteful and slovenly practice. A good crop of oats should be reaped, like wheat, close to the ground, and tied in sheaves. A cradle scythe or a short Hainault scythe does the work well in the hands of an expert mower, who should be followed by binders, who gather the straw with their hands, and lay it regularly on the ground, if it be not fit to tie up immediately: the straw should afterwards be tied up into sheaves, and set with the corn uppermost in shocks of ten or twelve sheaves, leaning against each other, and open at bottom, in order to allow the air to pass through. Thus, in a short time the oats become sufficiently dry to be stacked, or carried immediately into the barn. The produce of an acre of oats varies according to the soil and preparation, from four to eight and even ten quarters.

Oats ground into a coarse meal form a considerable portion of the food of labourers and many men in the middle ranks of life in Scotland, Ireland, and the north of England. The meal is simply stirred into boiling water with a little salt, until it becomes of the consistency of a hasty-pudding; it is then called porridge or stir-about; and when eaten with milk or treacle makes a wholesome and palatable food. It is sometimes mixed with the thin liquor of boiled meat, or the water in which cabbages or kale have been boiled, and acquires the denomination of beef-brose or kale-brose. When made into a dough with water, and baked on an iron plate in thin cakes, it makes a bread, which is very palatable to those who are accustomed to it, and who often prefer it to wheaten bread. Its use was once almost universal in Scotland, which has in consequence been called the Land of Cakes. In Germany and Switzerland the coarsely bruised oat-meal is put into an oven till it becomes of a brown colour; it is then called

haber-meel, and is used in broths and pottages, as the semolina, made from wheat, is used in France and Italy. The coarsely broken grains, after the husk has been removed, form grits, which are extensively used to make gruel for children and invalids. The chaff of oats put into a canvas bag forms a good substitute for feather-beds for the poor, and is far more wholesome than feathers, from the ease with which it may be renewed at little or no cost.

In some countries the oats are given to horses in the straw, without threshing them; and where the quantity is regulated, the practice is good. The horses masticate the corn better in the chaff, and the straw is wholesome; but where horses do hard work, they would be too long in eating a sufficient quantity, and it is better to give them oat chaff threshed and cleaned, with clover hay cut into chaff. When hay is dear, it is often cheaper to increase the quantity of oats, and to give it with wheat-straw cut fine. In this way very little hay is required. The calculation is easily made when we consider that a pound of good oats gives as much nourishment to a horse as two pounds of the best clover, or saintfoin hay. A truss of hay of 56 pounds is therefore equal to 28 pounds of oats; or a bushel of the best oats will go as far as one truss and a half of hay; and if this quantity is worth four shillings, which is at the rate of  $\frac{1}{4}$  16s. per load of thirty-six trusses, the equivalent price of oats is 32s. per quarter.

Farmers who have hay-ricks from which they often allow their men to take as much as they please for their horses, will carefully measure out the oats, which probably are much cheaper. Some men who keep many horses, cut all the hay into chaff by a machine, and mixing this with a proper proportion of oats, feed all their horses in mangers with a certain allowance of the mixture, a practice much more economical than that usually adopted. In France and Germany the practice of baking oats, as well as rye, into loaves for horse-food, is gaining ground, and is said to be attended by an evident saving of food.

#### OAXACA. [MEXICAN STATES.]

OBADI'AH (עֲבַדְיָה, Ὀβεδίας) was one of the twelve

minor Hebrew prophets. The name corresponds to the common Arabian name Abdallah, meaning *a servant of God*; it occurs several times in the Old Testament (*1 Kings*, xviii. 3; *1 Chron.*, iii. 21; vii. 3; ix. 16; *2 Chron.*, xvii. 7; xxxiv. 12); but neither of the persons mentioned in these passages appears to have been the prophet, about whose personal history we know nothing. His prophecy appears from internal evidence (verses 11-14, 20) to have been written shortly after the destruction of Jerusalem in the year 587 B.C. He was therefore contemporary with Jeremiah; and we find a striking resemblance between some passages in these two prophets (compare *Obadiah*, 1-4, 5, 6, 8, with *Jer.*, xlix. 14-16, 9, 10, 7). The question here is, which of these writers copied from the other? We know that Jeremiah quoted other prophets, and therefore it is nothing strange to find in him a quotation from Obadiah; and critics who have carefully examined the passages in question have thought that those in *Jeremiah* bear marks of being copied from *Obadiah*. The reason why the book of *Obadiah* has been placed so much out of its chronological order in the Hebrew Bible is thought to be, because its subject is so closely connected with the last verses of the prophecy of *Amos*, which immediately precedes it.

The prophecy of *Obadiah* is the shortest book in the Old Testament, consisting of only one chapter. The prophet denounces the destruction of Edom, on account of their insolent triumph in the day of the captivity of their Hebrew brethren and in the destruction of Jerusalem (verses 1-16), and foretells the restoration of the Jews, the subjection of their enemies, and of Edom among the rest, and the setting up of the kingdom of the Lord (verses 17-21). The conduct of the Edomites at the fall of Jerusalem, which is referred to in the former part of this prophecy, is not mentioned in the Old Testament history, but it is alluded to by other prophets and by a writer in the *Psalms* (*Ezek.* xxv. 12; xxxv; *Jerem.*, xlix. 7-22; *Amos*, i. 11; *Psalms*, cxxxvii. 7). The latter part is supposed to have been accomplished in the return of the Jews from Babylon and the victories of the Maccabees over the Edomites, but the last words seem to refer to the more remote period when all the world shall become the kingdom of God (compare *Rev.*, xi. 15; xix. 6). The style of Obadiah is clear and energetic: his prophecy forms a short poem.



(Rosenmüller's *Scholia*; Schnurrer's *Dissertation*; the *Introductions* of Eichhorn, Jahn, De Wette, and Horne.)

OBE'LIA. [PULMOGRADA.]

OBEIDALLAH. [FATIMIDS.]

OBELISK, from the Greek 'obeliscus' (ὀβελίσκος), the diminutive of 'obelus' (ὀβελός), which signifies a 'skewer' or 'needle' (Herod., ii. 41), but is also used by Herodotus (ii. 111) to signify an *obelisk*: the Italian name *aguglia* and the French *aiguille* (needle) are from the Latin *acus*. An obelisk is a lofty monumental four-sided shaft diminishing upwards with the sides gently inclined, but not so as to terminate in an apex at the top; neither is it merely truncated or cut off at the summit, but the sides are sloped off so as to form a flattish pyramidal figure, by which the whole is suitably finished off and brought to a point, without the upper part being so contracted as to appear insignificant. Herein, as well as in their purpose and application, besides other circumstances, obelisks differ from spires, which are carried up from their base to a point, and which nevertheless are beautiful on that very account. It may be asked why the same form that pleases the eye in the one case would be disagreeable in the other. To answer this question we must consider not only wherein they agree, but wherein they differ. Whether perfectly square or not, obelisks are uniformly quadrilateral, whereas spires are polygonal, and consequently the bases of their sides are much narrower in proportion to their entire diameter, so that the diminution is not so sudden as it would be in a four-sided mass of the same bulk and height. Secondly, a spire is generally terminated by a pinnacle, cross, or some other ornament at its summit, whereby sufficient importance is given to it; and thirdly, a spire neither is nor is intended to look like a solid mass of stone, but requires to have a certain expression of lightness, both in itself and so as to bring it into harmony with the rest of the building. An obelisk, on the contrary, either is or is intended to appear not only a solid mass, but a single stone, standing upon a massive pedestal, and that pedestal resting on the ground. Hence it is obvious that so far from being attended with any beauty, the reducing it to a mere point would greatly impair its character, and in a measure destroy all nobleness of appearance towards its summit, because it would be of inconsiderable bulk for a considerable length downwards.

Though the mere form of the obelisk has no particular beauty to recommend it, as is proved by the meanness and pettiness of little obelisks employed merely as decorations in *cafafuchi*, and also in many buildings of the time of James I., yet when wrought out of 'time-defying material,' and of colossal dimensions, it produces a most imposing effect. As a monument an obelisk is greatly preferable to a column, inasmuch as it possesses all that recommends the latter without being open to the objection of being a mere imitation of what was designed for a totally different purpose, and never intended to be insulated or considered as complete in itself. The greater diameter of the capital and abacus, which is both a beauty and propriety in a column supporting a superincumbent mass, ceases to be so, or rather becomes quite the contrary, when the column supports nothing. The abacus, forming in fact a square platform on its summit, overhanging the structure itself at its angles, gives the whole a top-heavy appearance, which is still further increased by a railing upon it. The London Monument and the York Column in London are examples of this perversion. Though not properly an obelisk, it being built up of masonry, the Wellington Testimonial in Phoenix Park, Dublin, is a much nobler object than a column of the same dimensions would have been; and it is to be regretted that the obelisk form was not made choice of for the monolith of Finland granite (84 feet high) erected at St. Petersburg as the Alexander column. Where, instead of being one solid mass, a monument of the kind must be constructed of separate stones, there may so far be some reason for rejecting such shape; yet where the greatest difficulty was accomplished, namely, that of obtaining a monolith of sufficient dimensions, very little short of those of the largest antient obelisks, and exceeding the generality of them, it was unfortunate that the usual pillar-shape was preferred, surmounted by the usual square platform.

Much learning and research have been expended by Zoëga and others in endeavouring to ascertain the origin of obelisks, yet without throwing any very satisfactory light on that part of the question. Antiquaries have in fact endeavoured to find positive evidence where none was to

be obtained; for the case itself is not, like that of a particular invention or discovery, referrible to some precise period or nation. On the contrary, from the very earliest ages it had been the practice to mark some particular spot, the scene of some important event, by what might serve as a durable monument of it; nor would any thing more naturally suggest itself for such purpose than fixing in an upright position a stone of unusual dimensions. The Bible makes mention of this practice; and it prevailed not only in the East, and in the early ages of the world, but has prevailed among nearly all nations either in a savage state or in an early stage of civilization. Among the Egyptians therefore the practice was not otherwise very remarkable than on account of their continuing it, and bringing such simple primæval monuments to great perfection, making them of stupendous dimensions, working them in the most elaborate manner, and adorning them with hieroglyphics, though not indeed invariably, for there are instances of Egyptian obelisks which are not so sculptured; among others that in front of St. Peter's at Rome, and the one before the church of Santa Maria Maggiore.

Small obelisks were sometimes of sandstone or granite, but the larger Egyptian obelisks are all of the red granite of Syene; and it is certainly astonishing how such enormous masses of that material could be quarried out, and afterwards removed and placed in their position. We may conjecture that the Egyptians detached the large masses of rock for their obelisks somewhat in the same way that was adopted by the natives of India on the occasion of raising the great granite obelisk at Seringapatam in the year 1805. In this instance a groove about two inches wide and deep was chiselled out by the workmen in the line where it was required to separate the stone; which being done, a fire was kindled upon it from end to end, and kept up until the stone was sufficiently heated, when the embers were blown off, and cold water poured into the groove, whereby a clear fracture in the stone was made without further labour. Indeed the mode in which the Egyptians worked their quarries is clear enough at the present day from an inspection of the excavations: see Gau's *Nubia*, pl. 9, and the French work on Egypt, *Antiq.*, i., pl. 32. Among the Egyptians, when the block had been thus hewn out of the quarry, it was conveyed away by a raft on a canal brought up to the very edge of the rock, either at the time of the inundation, when the water would rise to a sufficient level, or by lowering the block down an inclined plane or platform to the raft; or by digging a canal from the river to the site of the block, and bringing a boat under the obelisk, in the manner described by Pliny (xxxvi., chap. 9). The granite block was afterwards polished, and probably raised in the same way as the Seringapatam obelisk, by means of banks of earth.

For raising the obelisk before St. Peter's (supposed to be that brought from Heliopolis by Caligula), no fewer than five hundred different projects were submitted by architects and engineers to the pope Sixtus V., and Domenico Fontana was thought to have accomplished little short of a miracle in rearing it by means of very complex machinery and several hundreds of workmen and horses. The process by which the Lateran obelisk was originally erected at Rome seems to have been equally complicated and laborious. (Ammian. Marcell., xvii. 4.) How the Egyptians raised such masses of granite is not known, but probably by a much simpler mode, whether similar or not to that practised in elevating upon its pedestal the one at Seringapatam. According to Colonel Wilks's account of the operations, this obelisk, a single stone about sixty feet long and six square at its base, was placed horizontally upon a mound, or platform of earth, secured by strong walls, and level with the top of the pedestal, the base of the obelisk being placed just on the ledge of the pedestal. The shaft having been laid on planks or timber poles, these served as fulcra, by means of which the smaller end or top was gradually raised; wedges were put under it and earth rammed in, which was repeated until the platform became an inclined plane as steep as it could with safety be carried up. The shaft being got thus far out of its horizontal position towards a perpendicular one, ropes were then applied, worked by a strong timber scaffold nearly as high as the obelisk itself, enclosing the other three sides of the pedestal, and being also employed in a contrary direction in order to bring it down on the pedestal with too sudden

By the Egyptians themselves obelisks do not have been raised as insulated monuments or signs

but as the accompaniments to temples and palaces, where they were placed in pairs, that is, one on each side of a large entrance, or *propylon*, and it may therefore be inferred that some particular signification was attached to them. They were also sometimes placed in the interior courts of temples. With respect to their proportions, the shafts of obelisks were usually about ten diameters in height, and one-fourth narrower at top than at their base. The pyramidion, or apex, was made much more pointed in some obelisks than in others. One singularity is that few Egyptian obelisks are perfectly square, two of their sides being generally somewhat broader than the other two, which may be accounted for by what has just been said, namely, that they were placed against buildings, and not intended to be insulated objects viewed from every direction. The face of an obelisk is sometimes slightly convex, instead of being quite plain; as is the case with one side of the Lateran obelisk.

The number of obelisks in Egypt must have been at one time very considerable, yet we are not therefore to suppose that the erection of them was a frequent circumstance, since, once formed, they were almost imperishable, and would therefore greatly increase in the course of ages. Many that are still remaining are no longer standing; and in some places several have been found on the same spot, some still standing, others lying on the ground. When the Romans became masters of Egypt, they removed many of these monuments to their own capital, among others that of the Lateran, which is the largest now known, its shaft being 105 feet (although it has been reduced, a portion at the lower part having been cut off in consequence of being fractured), and two of its sides 9 feet 8½ inches, the other two 9 feet. This obelisk was first conveyed from Heliopolis to Alexandria by Constantine, and by that emperor's son Constantius brought from the latter city to Rome, where it was erected in the Circus Maximus. The shaft of the Lateran obelisk weighs about 445 tons in round numbers. Augustus also had previously brought two from Heliopolis. That which was originally placed in the Vatican Circus by Caligula, and now stands in the piazza of St. Peter's, is next in size to that of the Lateran, though supposed to have been somewhat abridged of its original dimensions. The entire height, including the pedestal and the ornament at top, is about 132 feet; the shaft itself is 83 feet, and 8 feet 10 inches square at its base, and 5 feet 11 inches at the other end. In the At-Meidan at Constantinople there is an obelisk about 50 feet high, said to have been erected by the emperor Theodosius.

During the calamities that befel Rome under its barbarian invaders after the downfall of the empire, the obelisks were damaged and overthrown, but they have been gradually restored under various pontiffs. The following table contains a list of the Roman obelisks, with their dimensions and other particulars:—

#### I.—Sixtus V., 1586.

The Vatican, in front of St. Peter's, where it was removed by Fontana from the Vatican Circus. On the side facing the church, and on the opposite side, we see the dedication to Augustus and Tiberius.

Whole height	ft.	in.
Ditto without base and modern ornaments at top, cross, &c.	83	2 8

Without hieroglyphics, and still entire.

#### II.—Sixtus V., 1587.

In front of the church of Santa Maria Maggiore, erected by Fontana.

Whole height	ft.	in.
Ditto without base and modern ornaments at top, cross, &c.	83	9 5
	48	4 8

Without hieroglyphics; broken in three or more places.

#### III.—Sixtus V., 1588.

In front of the St. John Lateran church, erected by Fontana.

Whole height	ft.	in.
Without base, &c.	141	7 2
	105	7 2

Hieroglyphics; broken in three pieces.

#### IV.—Sixtus V., 1589.

Flaminio del Popolo, erected by Fontana.

Whole height	ft.	in.
Without base, &c.	about 116	0 5
	78	5 5

Hieroglyphics; broken in three places.

#### V.—Innocent X., 1651.

In the Piazza Navona; sometimes called the Pamphilian obelisk.

Whole height	ft.	in.
Without base, &c.	about 99	0 2
	54	3 2

Hieroglyphics; fountain round the base.

#### VI.—Alexander VII., 1667.

Minervae della Minerva, erected by Bernini.

This obelisk, with singular bad taste, is placed on the back of a horrible elephant, the work of Bernini.

Whole height	ft.	in.
Without base, &c.	about 39	7 5
	17	0 2

Hieroglyphics.

#### VII.—Clement XI., 1711.

Mahuteo della Rotonda, in front of the Pantheon of Agrippa.

Whole height	ft.	in.
Ditto without base, &c.	47	8 35
	19	9 35

Hieroglyphics; probably the pendant of No. 6: Fountain round the base.

#### VIII.—Pius VI., 1786.

Quirinale di Monte Cavallo, erected by Antinori.

Whole height	ft.	in.
Without base, &c.	94	11 55
	47	8 1

No hieroglyphics; appears broken in two or three places.—Zoëga, pl. 6.

#### IX.—Pius VI., 1789.

Sallustiano della Trinità di Monte, erected by Antinori.

Whole height	ft.	in.
Ditto without base, &c.	99	11
	43	6

Hieroglyphics.—Zoëga, pl. 7.

#### X.—Pius VI., 1792.

Campense di Monte Citorio, by Antinori.

Whole height	ft.	in.
Ditto without base, &c.	110	0
	71	6

Hieroglyphics.—Zoëga, pl. 8.

#### XI.—Pius VII., 1822.

Aureliano della Passeggiata, on the Monte Pincio.

Whole height	ft.	in.
Ditto without base, &c.	56	7 3
	30	0 0

Hieroglyphics. This is called by Zoëga the *Barberini obelisk*, of which he says, 'Hic e Romanis obeliscis adhuc cognitis solus expectat sospitatorum.'

#### XII.—1817.

Private obelisk on the Cœlian Hill, in the gardens of the Villa Mattei; hardly worth mentioning. It is a small fragment of a real obelisk mounted on a piece of modern granite.

In the present century, the labour of bringing away and re-erecting an obelisk nearly equal to some of the largest removed by the Romans has been accomplished by the French. It is the smaller of the two which stood before the propylon of the temple at Luxor, and is about 76 feet high and 8 feet wide on the broader sides of its base. Permission for the removal of both the obelisks having been granted to the French government by the viceroy of Egypt, a vessel constructed for the purpose was sent out in March, 1831, under M. Lebas, an engineer, to whom the undertaking was confided, it being previously determined to bring away only one. After three months' labour with eight hundred men, an inclined plane was formed from the obelisk to the river, where the vessel lay; and having been first carefully encased by planks to secure it from injury, the monolith was lowered by nearly the same process afterwards employed for raising it again on its pedestal at Paris, where it safely arrived, up the Seine, December 23, 1833, and was deposited near the Pont de la Concorde. Nearly three years however elapsed before it was elevated in the centre of the Place de la Concorde, which delay was partly occasioned by its being necessary first to construct a pedestal of as massive materials as could be procured. Blocks of granite were accordingly fetched from Brittany, the largest of which, forming the die of the pedestal, is 10 feet square by 16 in height. An inclined plane leading from the river up to a platform of rough masonry level with the top of the pedestal was then formed, and the obelisk, having been placed on a kind of timber car or sledge, was dragged up by means of ropes and capstans. One edge of its base having been brought to the edge of the pedestal, it was reared perpendicularly by ropes and pulleys attached to the heads of ten

masts, five on each side, and within about three hours the operations were completed, under the direction of Lebas, October 25, 1836.

Some few years ago the project was entertained of bringing over to this country and erecting in our own metropolis the monolith called Cleopatra's Needle, one of the two granite obelisks at Alexandria, which is still standing, the other being on the ground. Including the pedestal, the entire height is about 79 feet, but the monolith itself does not exceed 63 feet, and is therefore smaller than the Luxor obelisk at Paris. The idea of removing it hither seems now however to be quite abandoned.

The largest Egyptian obelisk hitherto brought over to this country is that which was removed from the island of Philæ by Belzoni, and which is now erected at Kingston Hall, Dorsetshire, the seat of W. J. Bankes, Esq. It is a monolith of red Egyptian granite, 29 feet 1 inch in length, and its larger end, or base, 2 feet 2 inches square, the other being 1 foot 5½ inches.

Before the cathedral of Catania in Sicily is a small obelisk, said to be Egyptian, which is remarkable on account of its being not square but polygonal, and also for being placed on the back of an elephant raised on a lofty pedestal.

In the article Axum a drawing is given of an obelisk which differs somewhat from the genuine obelisk in form; but it will serve, together with that given in the article ARLES, which stands on an appropriate pedestal, to give an idea of the general appearance of one of these monuments on a large scale.

For further particulars the reader may consult the great work of Zoëga, Champollion, and the 'Egyptian Antiquities,' in the *Library of Entertaining Knowledge*, vol. i.

OBERLIN, JEREMIAH JAMES, was born at Strasburg on the 7th of August, 1735, and was educated at the gymnasium of that town. He afterwards spent a few months at Montbéliard for the purpose of learning the French language, and returned to Strasburg in 1750, where he prosecuted his university studies. He took the degree of Doctor of Philosophy in 1758, and afterwards paid considerable attention to the study of theology. In 1768 he was appointed a teacher in the gymnasium where he had been educated, and in 1763 was entrusted with the care of the library of the university of Strasburg, and obtained permission to give lectures on the Latin language. In 1770 he was appointed Professor of Rhetoric, and from this time was accustomed to give lectures on Greek and Roman archeology, ancient geography, &c. In 1778 he was appointed Extraordinary Professor in the university, in 1782 Ordinary Professor of Logic and Metaphysics, and in 1787 Director of the Gymnasium. During the Revolution his life was in considerable danger. He was imprisoned at the beginning of November, 1793, but obtained his liberty at the end of a few months; and again resumed his lectures at Strasburg, which he continued till his death, which took place on the 10th of October, 1806.

Oberlin was an accurate and industrious scholar. He published good editions of several of the Latin classics, of which his Tacitus and Cæsar are considered the most valuable. He had also paid great attention to the study of the ancient French language, and travelled more than once through some of the provinces of France in order to become acquainted with the different patois spoken in the country. He published several works on this subject, of which the most important are, 'Observations concernant le Patois et les Mœurs des Gens de la Campagne,' Strasb., 1791; and 'Essai sur le Patois Lorrain des Environs du Comté du Ban de la Roche,' 1775.

Oberlin was also the author of several other works, the principal of which are,—*Dissertatio Philologica de Veterum Ritu condiendi Mortuos*, 1757; *Rituum Romanorum Tabulæ in usum Auditorum*, 1774, reprinted in 1784; *Jugendorum Marium Fluviorumque omnis ævi Molimina*, 1770-1773; and *Dissertations sur les Minnesingers* (the Troubadours of Alsace), 1782-1789.

The life of Oberlin has been written by Schweighäuser in Latin, and by Winckler in the *Magas. Encyclopéd.*, 1807.

OBERLIN, JEAN FREDERIC, Protestant pastor in the Ban de la Roche, and younger brother of the philologist Jeremiah James Oberlin, was born at Strasburg on the 31st of August, 1740. His education was conducted with the greatest care by his intelligent and pious parents, and while yet a child he gave striking indications of the benevolence and self-denial which were afterwards so conspicu-

ous in his conduct. He had a strong taste for the military profession; but as it was his father's desire that he should devote himself to one of the learned professions, he pursued his studies at the university of Strasburg and received holy orders. While he was at the university, the preaching of Dr. Lorentz made a powerful impression on his mind, and he has left behind him a record of his strong religious feelings in a solemn dedication of himself to God, similar to that recommended by Doddridge in his 'Rise and Progress,' which is dated 'Strasburg, the 1st of January, 1760: renewed at Waldbach, the 1st of January, 1770.' He remained without a pastoral engagement for some years after his ordination (from 1760 to 1767), and during this period he was private tutor in the family of M. Ziegenhagen, an eminent surgeon at Strasburg. In the year 1766 he had just accepted the offer of a chaplainship to a French regiment, when he was invited by M. Stouber to succeed him as pastor of the Ban de la Roche. This post afforded to Oberlin the very opportunity which he longed for, to devote all his powers to the good of his fellow-men, and he therefore at once accepted it, and arrived at Waldbach to enter on his duties on the 30th of March, 1767.

The Ban de la Roche, or, as it is called in German, the Steinthal (valley of stone), was part of the former province of Alsace, in the north-east of France: it is situated on the western slope of the Haut Champ, or Champ de Feu, a range of mountains to the east of the Vosges, from which chain it is divided by a deep valley. The Ban contains two parishes, one of which is Rothau, and the other consists of the five hamlets of Foudai, Belmont, Waldbach, Bellefosse, and Zolbach. Nearly all the inhabitants of these hamlets are Lutherans. The soil is sterile, and nearly half of the land is covered with wood. The district was laid waste in the Thirty Years' War, and again in the time of Louis XIV.; so that in the middle of the eighteenth century it afforded a bare subsistence to some eighty or a hundred families, who were in a state little removed from barbarism, but who possessed one blessing of which all France except Alsace was deprived, namely, religious liberty, which had been guaranteed to the province of Alsace when it was united with France. In the year 1750 M. Stouber became pastor of this district, and succeeded by great exertions in establishing efficient schools, and in distributing Bibles through the parish, where they had been so scarce before, that the former minister had not possessed a copy. Stouber removed to Strasburg in 1767, after finding in Oberlin a successor well qualified to carry on the work he had begun. Notwithstanding all Stouber's exertions, Oberlin found his parish in a wretched state, and a large party in it obstinately prejudiced against any improvement, and prepared to oppose all his plans. It was only by his great decision and mildness that he escaped personal violence on one or two occasions soon after his arrival. From the moment he set foot in his parish he directed all his energies and learning to the civilization and religious improvement of his people. His first object was to bring them into communication with their better instructed neighbours, from whom they were entirely cut off by the want of roads. He assembled the people, and proposed to them to make a road to Strasburg by blasting the rocks and building a bridge across the river Bruche at Rothau. The peasants with one voice declared the thing to be impossible. Oberlin reasoned with them in vain. At length he took up a pickaxe, and, inviting all who saw the importance of his plan to follow him, he set to work with his own hands. The peasants at once joined him, and by their efforts, assisted by the contributions of Oberlin's friends, the road was made and the bridge built by the beginning of the year 1770. The results which Oberlin had foreseen soon followed. The people could now dispose of their produce and supply their wants; agricultural implements were imported; and several young men from his parish were apprenticed in Strasburg to the most useful mechanical trades, which were thus introduced into the Steinthal. Oberlin next turned his attention to the agriculture of the district, which was in the worst possible state; but he found his people little disposed to be taught their own art by one brought up in a town. He went, as before, to their senses, by planting with fruit large gardens belonging to the pastor's house, and crossed by public footpaths. His trees first drew the people came to him to beg for slips and to learn rearing them; and in a few years the desolate Ban de la Roche were surrounded with



The potatoes, which were the principal food of the people, had so degenerated, that some fields only yielded about one-third of their former crop. The people blamed the land; but Oberlin procured new seed; and as the soil of the mountains was well adapted to the culture of the potato, abundant crops, and of a very superior quality, were soon obtained. He also introduced the culture of flax and Dutch clover, taught the people the value of manure, persuaded them to convert a great quantity of pasturage into arable land, and established an agricultural society and a fund for the distribution of prizes to the farmers.

Oberlin was no less zealous in promoting education in his parish. He procured the erection of a new school-house at Waldbach in place of the log-hut built by Stouber, which had fallen to decay; and in a few years a new school-house was built in each of the other four hamlets. To him also belongs the honour of being the founder of infant-schools, which he established in each commune, placing them under the management of conductresses paid at his own expense. In these schools the children were not allowed to speak a word of patois. In the higher schools the subjects taught were reading, writing, arithmetic, geography, the principles of agriculture, astronomy, and sacred and profane history. Oberlin carefully superintended all the schools, and reserved the religious instruction almost entirely to himself. He made great efforts to supply the people with suitable books, some of which were printed at his own expense: among these was an almanac which he drew up for the use of his parishioners.

None of these schemes for the worldly advantage of his flock ever diverted Oberlin from his peculiar duties as their religious teacher. He constantly laboured to impress upon them that they must do everything from religious principle, and even the planting of trees and the repairing of a road were represented by him as works which were to be performed from love to God, who has commanded us to live for each other's welfare, and from love to Christ, who spent his life in doing good. So far did he carry this mode of connecting faith and good works, that he required of all young persons applying for confirmation a certificate from their parents of their having planted two trees. His preaching was simple, impressive, and affectionate, well adapted to the minds of his people, and perfectly orthodox. In the year 1782 he founded a Christian Society for the religious improvement of his flock; and dissolved it in 1783, on account of the opposition it met with from some, whom his gentle spirit did not wish to offend. His own conduct was always influenced by the most sincere piety, and by a strong practical faith in a superintending Providence. This faith he carried so far, that he used to keep by him slips of paper with the words *Oui* and *Non* written on them, with which he drew lots whenever he found himself unable to decide which of two courses to pursue, believing that 'the lot is cast into the lap, but the whole disposing thereof is of the Lord.' (*Prov.*, xvi. 33.) At the time of the French Revolution, the Ban de la Roche was not only secured from molestation by the well-known character of the people and their pastor, but Oberlin was even able to afford an asylum to several proscribed persons. Once indeed he was cited before the supreme tribunal of Alsace on a political charge, when he was not only acquitted, but received an assurance from the court of their deep regret that he should have been called from the scene of his labours. In 1795 he renounced his stipend on account of the poverty of his people, leaving each of them to contribute what they could to his support. His economy was as strict as his benevolence was extensive. He was never known to owe a single sous; and he made it a point of conscience to set apart for religious and charitable purposes the three tithes required of the Jews by the Mosaic law. He was a warm supporter of the Missionary Society, and the first foreign correspondent of the British and Foreign Bible Society. When the assignats were issued by the French revolutionary government, he soon foresaw their depreciation, and began to buy them up from his people to prevent them losing by them: in the space of twenty-five years he succeeded in redeeming all that had been brought into the Ban de la Roche.

Among the employments which Oberlin found for his people were straw-plaiting, knitting, dyeing with the plants of the country, and weaving. About the year 1813 the industry of the district received a fortunate stimulus through the introduction of the ribbon manufactory by M. Legrand, formerly a director of the Helvetic Republic, who was

induced by his esteem for Oberlin's character to remove with his two sons from Basle to the Ban de la Roche. In this family Oberlin found faithful friends and able assistants in his plans of usefulness.

Among the old evils under which the Ban de la Roche had suffered, one of the greatest was the remains of the feudal system, out of which had arisen a ruinous law between the peasantry and the seigneurs respecting the right to the extensive forests of the district. Oberlin persuaded the parties to come to an agreement, and the treaty with which that agreement was signed was solemnly presented to him by the maires of the district on the 6th of June, 1813. Nor was this the only civic honour he received for Louis XVIII. presented him with the decoration of the Legion of Honour as an acknowledgement of the services which he had rendered to a numerous population; and in 1818 he received a gold medal from the Royal and Central Agricultural Society of Paris. His Memoirs contain accounts written by several persons, of very different characters and pursuits, of visits to the Ban de la Roche during Oberlin's life, and all of them bear witness to the astonishing results of his labours, as shown by the intelligence and piety, the politeness and hospitality, the industry, benevolence, and happiness of the people whom he had found wretched, ignorant, and half-savage. Those readers who wish further information as to his character, habits, and personal appearance, are referred to the work mentioned below.

Oberlin died on the 1st of June, 1826, in the 86th year of his age and the 59th of his residence in the Ban de la Roche. He was buried at Foudai on the 5th of June. Nearly all his flock followed their *Cher Papa*, as they always called him, to the grave, and several Roman Catholic priests, with all the Protestant clergy in the neighbourhood, joined in the funeral rites. An affectionate parting address to his people, which he had left behind him, was read from the pulpit on the occasion.

Oberlin was married on the 6th July, 1768, to Madeleine Salomé Witter, who died on the 18th January, 1784. He had nine children, two of whom died very young. The other seven were brought up under his own care, and lived to help him in his labours. Their names were—Frédéric, who died in 1793; Fidélité Caroline, who was married in 1793 to the Rev. James Wolff, of Mittelbergheim, and died in 1809; Charles Conservé, who became in 1806 pastor of Rothau, in the Ban de la Roche, where he still resided in 1838; Louisa Charité; Henrietta, married to the Rev. M. Graff; and Frederica Bienvenue, married to the Rev. M. Rauscher. Oberlin was succeeded by his son-in-law, M. Graff, who had been his assistant for some time: but he was soon obliged to remove to Strasburg on account of ill health, and was succeeded by M. Rauscher, the present pastor.

(*Memoirs of John Frederic Oberlin*, 8th edit., with a *Short Notice of Louisa Schepler*, London, 1838. The 2nd edition of this work was reviewed in the '*Journal of Education*,' vol. i., p. 362.)

Any account of Oberlin's life would be incomplete without some notice of LOUISA SCHEPLER, who was originally his servant and a conductress in one of his schools. Upon the death of Oberlin's wife she became his housekeeper, and soon after she begged him to pay her no more wages, but to treat her as one of his children. Her request was complied with, and she lived in Oberlin's family till and after his death, employing all her energies and the whole of a little property which she possessed in works of benevolence. In August, 1829, she received one of the *Prix de Vertu* distributed annually by the Académie Française, amounting to 5000 francs, the whole of which she laid out in assisting the poor and in other benevolent objects. She died on the 25th of July, 1837, at the age of 76, having been a conductress 33 years.

OBESITY is an excessive accumulation of fat in various parts of the body. It is not possible to define the boundary beyond which the fat in the body can be called excessive, for persons possessing it in the most varied degrees enjoy equally good health, and the same person may at different times possess more or less without any injury to his comfort. The average quantity of fat in healthy men is from  $\frac{1}{10}$  to  $\frac{1}{8}$  of the weight of the whole body.

Obesity may occur at all ages; it is not uncommon in children; is far more rare in youth and in the early periods of manhood; and is most common after the age of 40, at which time an increase in the quantity of fat is observed in perhaps the majority of persons.

**The** chief accumulations of fat take place beneath the muscles, in the omentum and mesentery, about the heart, on the chest, and under the chin. In all these parts a certain quantity of fat naturally exists, and here therefore its amount is merely increased; but in cases of excessive obesity, it accumulates in situations where before there was none, as among the minute fibres of the muscles even of the heart, and in various other tissues.

The common effects or accompaniments of excessive fatness are sleepiness and heaviness, indisposition or incapacity for active exertion, shortness of breath, a weak action of the heart, and a general torpor of all the functions of the body. It predisposes to various congestive diseases, as apoplexy, &c.

The remedies for obesity are unfortunately not so well known or so efficacious as the modes of producing it. Perfect quietude, a bountiful supply of nutritious food, and long sleep are the means by which the grazier rarely fails to produce obesity in his cattle: and it is in general found that a plan exactly the reverse of this is the most successful means of relieving men from the same condition. Dr. Radcliffe's brief advice 'to keep the eyes open and the mouth shut' embodies nearly all the curative means for this disorder. A small quantity of food, and that of the least nutritive kind, active exercise both of body and mind, diminished quantity of sleep, an avoidance of all indulgence, and the maintenance of the various secretions in at least their natural quantity, are the only means that can be employed with the least prospect of benefit. It is true these are often insufficient, but they should still be persevered in to prevent the malady from growing worse, an evil which the opposite course will undoubtedly ensure.

**OBI'DOS**, a small town of Portuguese Estremadura, situated near a lagoon which communicates with the sea, about 50 miles north of Lisbon, and on the west side of the ridge which crosses the country from north to south. This place has become memorable in the history of our own times through the battle which took place near it on the 17th August, 1808, between the English, commanded by Sir Arthur Wellesley, who was advancing from Mondego Bay, where he had landed about a fortnight before, and the French, commanded by General Delaborde. The English attacked and drove the French from their position with the loss of six hundred men. The French general fell back upon Torres Vedras, where he was joined by Junot, who soon after fought the battle of Vimeiro with a similar result. The battle of Obidos was the first of a long series of engagements between the English and the French in the Spanish Peninsula, which continued till 1814.

**OBJECT GLASS.** [TELESCOPE.]

**OBLATE**, a term applied to a spheroid which is made by the revolution of an ellipse about the smaller of the two axes.

**OBLIQUE.** This term is used as opposed to direct or right, and signifies whatever is not direct or right. The word seldom appears, except as expressing that an angle is not a right angle, all other uses of it being almost obsolete.

**OBLIQUITY**, a term used in astronomy to express the angle made by the ecliptic with the equator. The greatest latitude at which the sun ever appears vertical is the obliquity of the ecliptic. [SUN; PRECESSION AND NUTATION.]

**OBLONG**, a word in common use, expressing the same meaning as, and in our opinion preferable to, the mathematical term rectangular, or having the figure of a rectangle.

**OBOE** (*Ital.*), a musical instrument of the pneumatic kind, blown through a reed: it is a tube of boxwood, 22 inches in length, slender in the upper part, but spreads out conically at the lower end, and consists of three joints, or pieces, besides the reed. Its compass is two octaves and a fifth, from c below the treble clef, to g, the fourth added line above it:—



Modern improvements have augmented the resources of the Oboe by means of eleven keys, but only skilful performers can safely be trusted to produce the two or three highest notes; and till very recently, e, or even c, above

the staff, was considered the utmost practicable extent of the instrument. Oboes are now frequently made to go down to b $\flat$ , in which case they exceed the usual length, and have an additional key.

The Oboe has for centuries past been in use, and may be traced back to the reign of Edward III., in whose band oboes, under the denomination of *Wayghies*, were employed. Indeed our itinerant parish-musicians, the official precursors of what was once a merry season, retain the appellation of *Waits*, though they have long abandoned the instruments which conferred on them their title.

Up to nearly the close of the last century, this instrument was only known, in most parts of Europe, by its French name, *Hautbois*, a word which in England has always been pronounced *Hoboy*; and this pronunciation has been transferred to the Italian term, through the word Oboe is now invariably adopted in writing.

**O'BOLUS** ( $\delta\beta\omicron\lambda\omicron\varsigma$ ), was a Greek coin, both silver and brass. At Athens it was of silver, the sixth part of a drachma, and worth somewhat more than five farthings sterling. The Æginetan obolus is stated to have been heavier than the Athenian. It is generally supposed that *óbolos* and *óbelos* ( $\delta\beta\omicron\lambda\omicron\varsigma$  and  $\delta\beta\epsilon\lambda\omicron\varsigma$ ) were originally the same word differently pronounced [*OBELISK*], and that the coin *obolus* was first of iron or copper, in form like a spit, which the word also means, or a bar; that a handful made a *drachme* ( $\delta\rho\alpha\chi\mu\acute{\eta}$ ); and that the form was afterwards changed from an oblong to a round shape, but that though struck round, like other money, it continued to retain the ancient name. Others say that the obolus was originally so called from being stamped with the figure of a skewer or spit, or other sharp-pointed instrument.

At a later period the obolus was of brass. Eckhel (*Doctrina Num. Vet.*, tom. i., p. 156) mentions a brass coin of Metapontum, which on the reverse bears the word *OBOAOE*. This coin, which is in the Imperial cabinet at Vienna, is engraved by Motraye (*Voyage*, tom. ii., tab. 7, n. 40). Pitiscus notices a similar coin bearing the same word, struck by the Nicæans. Wise, in the *Nummi Bodleiani*, in his 'Notæ in Nummos Populorum,' p. 134 a, observes that the Chians designated their brass coin by the same term; 'Chii monetæ suæ æræ valorem nominatim designabant, ut *OBOAOE*, *obolus*.' The small silver coin of Athens, bearing on one side two bodies of an owl rising into one head, is supposed to be the obolus. There are small brass coins of Athens also of the same type.

The Greeks had an hemi-obólion ( $\eta\mu\iota\omega\beta\omicron\lambda\omicron\iota\omicron\nu$ ), or semi-obolus, and a *trióbolon* ( $\tau\rho\iota\omega\beta\omicron\lambda\omicron\nu$ ), or silver coin of three oboli, which was the common pay of the Dicastæ; the pay originally having been two oboli. Two *oboli* were placed in the mouth of a dead person, in order to enable him to pay for his passage over Styx. According to Lucian, Charon's demand was only one obolus. (Aristoph., *Progs.* 141; Lucian, *Catapl.* i., p. 643.)

According to Suidas ( $\delta\beta\omicron\lambda\omicron\varsigma$ ), the Athenian *obolus* contained six *chalci* ( $\chi\alpha\lambda\kappa\omicron\iota$ ), and the *chalcus* contained seven *lepta* ( $\lambda\epsilon\pi\tau\acute{\alpha}$ ). Other authorities say that the *obolus* contained eight *chalci*.

(Julii Pollucis *Onomasticon*; Pitisci *Lex. Antiq. Rom.*; Rasche, *Lexicon Rei Nummarie*, tom. iii., p. 2, 32; Boeckh's *Public Economy of Athens*, i. 132; ii. 386, Engl. tr.)

**OBSERVANTS**, Friars, a branch of the Franciscans. Some considerable relaxation having been gradually effected in the rule of the Franciscan order, it was thought requisite, as nearly as possible, to restore it to its first rule and original institution; whereupon such as continued under the relaxed order were called *Conventuals*, and such as accepted the reformation were called *Observants*, or *Recollects*. This reformation was begun about A.D. 1400, by St. Bernard, or Bernardin, of Siena, was confirmed by the Council of Constance, A.D. 1414, and afterwards by Eugenius IV. and other popes.

The Observants were brought into England by king Edward IV., who allowed them to fix their first residence at Greenwich. King Henry VII., by his charter bearing date 1486, after reciting that his predecessor, king Edward IV., had, by the pope's licence, given to certain Minorites, or Observant Friars of the Order of St. Francis, a piece of ground adjoining to his palace there, on which were ancient buildings, and that these friars having taken session, and having laid the first stone with great sollem-  
nity, began to build several small mansions in honour

Virginia Mary, St. Francis, and all Saints granted and confirmed the said premises, and founded a convent of friars of the Order above described, to consist of a warden and twelve brethren at the least. (*Cart.*, 1 Henry VII., n. 24.) It is said that he afterwards rebuilt their convent for them from the foundation. (*Hist of the Eng. Franciscans*, p. 216.)

Catharine of Aragon, the first wife of Henry VIII., was a great favourer of this convent and their order. She appointed one of the friars of Greenwich, father John Forrest, to be her confessor; and while she was resident at this place, she used to rise at midnight and join the friars in their devotions. The friars were grateful, and openly maintained her cause when the subject of the divorce was agitated. The king was so much irritated by this conduct, that he suppressed the Order altogether.

The convent at Greenwich was suppressed August 11, 1534. On the accession of queen Mary to the throne however, the Observant friars appeared again in public, and returning to Greenwich, began to form themselves into a community. The queen reinstated them in their possessions, founded their monastery anew, and repaired it at her own cost, out of gratitude for their fidelity to her mother. Queen Elizabeth expelled the friars, and suppressed their monastery again, on June 12th, 1559.

(Tanner, *Notit. Monast.*, edit. Nasm., p. xiii.; *History of the English Franciscans*, ut supr.; Stevens's *Contin. of Dugd. Monast.*; Lysons's *Environs of London*, ed. 1811, vol. i., pp. 527, 528.)

**OBSERVATION AND EXPERIMENT.** The first of these terms includes a portion of the second, inasmuch as every experiment is made with a view of observing the result. But the latter signifies more than the former, implying a disposition of means of observation which it is in the power of the experimenter to make for himself, and which he actually did make for himself. If, for example, a person who observed the attraction of the magnet for the first time, dubious of the residence of the attracting power, were to move the magnet to another place, that he might see whether the attracted body would still move towards it, he would make an experiment. But if his magnet were the sun and the attracted body the earth, he could only wait the proper times for observing the motion of the latter with respect to the former, in order to establish the attraction. Thus astronomy, geology, meteorology, natural history, &c. are sciences of observation (that is, of nothing but observation); while mechanics, optics, electricity, &c. are sciences of experiment. In one sense geology and meteorology are partly sciences of experiment, since portions of the material subject-matters of these sciences may be submitted to preconcerted tests. It would however be more proper to consider mineralogy and aero-mechanics as the experimental sciences connected with these, than to class them as mixed sciences.

To give an account of experiment would require us to explain the methods of every science which proceeds upon it: to give a detailed account of observation, we should need the description of all the means or instruments by which our senses are assisted in the examination of phenomena. We shall here confine ourselves to a short sketch of the errors which render observations discordant, and which make a final process of combination necessary in every case in which we cannot command results which agree with each other so well that the difference between them is imperceptible to the senses.

Everything which is called observation is of two kinds; in the first a simple individual fact is noted, in the second a magnitude is measured. The results of the first species are the proper subjects of inductive reasoning only; the results of the second, of inductive and mathematical reasoning, either or both. Individually, the first kind of observations are not necessarily subject to error: thus a zoologist observing the structure of a new animal might in every instance correctly note the resemblances which exist between it and other animals, and might refer it to its proper class in a manner which centuries of succeeding observation would not induce naturalists to disturb. Collectively however, wrong inferences might be drawn from facts; thus results of classification which are true of all animals known up to one moment, and are therefore inferred to be always true, may be disturbed in the next moment by the discovery of a new specimen.

Observations of the mathematical character are of necessity erroneous from the imperfections of our senses. When

a new insect is observed, it is soon seen, for instance, whether it has or has not wings, and the question once settled is finally settled. But when, say the specific gravity of a gaseous substance, at a given pressure and temperature, is measured, it is impossible to consider the question as settled at any time. Say that, under given circumstances, the specific gravity is asserted to be .934 of that of air similarly circumstanced; this is only an admission, at most, of its being somewhere between .9335 and .9345. And that which we call an exact measurement of a length may for one purpose mean within a hundredth of an inch, for another within a thousandth, and so on; but no person dreams of having attained absolute truth. This being well known, and every process used in observation being subject to error, it is the business of the observer to repeat observations many times, and to extract a result as near to the truth as may be, from the mass of discordant materials which the repetition will furnish.

The necessary errors of observation arise from the imperfection of our perceptions and of the instruments which we use, and also from hasty or otherwise incorrect conclusions. The subject requires the separation of these errors into three classes, which may be mixed up with one another in results, and may be mistaken for one another. We may call them *fixed*, *personal*, and *casual*.

By a *fixed* error we mean one which is inherent in the instrument or method employed, so that it must exist, and, all other things remaining the same, must have a given magnitude. Thus, if the axis of an equatorial (supposing such an instrument to be employed for absolute measurements) do not absolutely coincide with that of the heavens, the right ascension and declination of a given star, measured when at a given distance from the meridian, must have a given error. It might be precisely the same in numerical effect, and would certainly produce an error of the same class, if the observer used a wrong formula in the reduction of his observations. Thus, it would be perfectly possible to give to one observer an incorrect instrument and a correct formula, and to another a correct instrument and an incorrect formula, in such manner that their final results should coincide.

Errors of this kind cannot be detected by multiplying similar observations, since there can be no tendency to destroy error in the mere repetition of it. There are many modes of detecting fixed errors, and of allowing for them; but the only mode of avoiding them is by taking advantage of the construction of the instrument to use it for the same purpose under different circumstances, in such manner that measurements which are too large in one set of results must be as much too small in the other. If the same number of observations be contained in each set, this, as we shall presently see, is really a reduction of the fixed error to the class of casual ones; or rather, a destruction of the fixed error by the same process which gives the highest probability of destroying the casual errors.

All instruments must be more or less erroneous in every particular. In the science of observation, as now understood, and in any matter in which the utmost attainable exactness is requisite, the assumption of perfection in an instrument, in any point whatsoever, is looked upon as nothing but the expression of the observer's unwillingness to take trouble. For even if ninety-nine successive days' trials have shown that any particular error does not exist to any sensible amount, it is not conclusive against the observations of the hundredth day being affected by some new circumstance, necessary or accidental, in which the instrument has been placed in the intermediate time.

By a *personal* error is meant one of the same character as a fixed error, but arising from the temperament or habits of the observer, and not from the instrument. Thus if A should, in noting the time of a phenomenon by the clock, have a tendency to accelerate the moment of its happening, and B a similar tendency to retard it, the results of the two would differ by the sum of their personal errors. It is only lately that it has been discovered that two individuals, observing the same phenomenon with the same species of instruments, may differ sensibly (though but little) from each other; and this not once or twice, but nearly always, and in such a manner as to make the average of a set of observations of one observer differ from that of the other. For anything we can know to the contrary, this species of error may exist in every observer; and its absolute quantity must be unknown until we can compare the observa-

ons of men subject to it with those of some other beings who are not. If indeed the personal error is purely casual, so that where one person measures too much, another measures too little, the average of the results of a large number of observers would give the truth or very near it. But should it be the case, which is not impossible, that all men are subject to an error of the same kind, some more and some less, namely, that all measure more or less too much, or else that all measure more or less too little, the average above mentioned would give, not the truth, but the truth affected by the average error of all the observers. Nor would the results obtained ever enable us to distinguish whether personal errors have a fixed average or not; for suppose the fact observed to be that A, one time with another, measures more than B; this may mean either of several things:—either A measures truly, and B too little; or B measures truly, and A too much; or B measures too little, and A too much; or both measure too little, but B more than A; or both measure too much, but A more than B. Now, if A and B were to observe together for a century, the mere comparison of their observations, though it would settle their average amount of difference, would never enable us to give the least guess which of the preceding cases is the true one. If indeed we could convert the observer, as we have previously mentioned might generally be done with the instrument, into another observer with an error of the opposite kind, a true result, or one sensibly true, might be obtained. Suppose, for example, it is the observer's habit, in noting the transit of a star over a fixed wire in the field of a telescope, to take the transit too soon when the star comes in on the right side, and too late when on the left: consequently, by making a number of observations with an inverting telescope, and an equal number with one which does not invert, the average of both sets would be as likely to give a true result as if neither error had existed.

All the errors which precede, though called errors because they give a result which is not the one intended to be obtained, yet are in fact the consequences of an actually existing state of things, and their laws can be determined by using the right means, or at least must be supposed to arise from natural causes determinable by experiment in the same manner as other consequences of existing relations. They are then really measures of phenomena, called errors simply because the effects of their causes are to be removed from the results. It is even possible that they might be made intentionally in a given form, with a view to prevent their occurrence in a more objectionable form. Thus, suppose an observer finds himself, in correcting discordant observations, apt to confound additions and subtractions, using one for the other: he will set his instrument intentionally wrong to an amount which casual discordances never reach, taking care, of course, to preserve means of correcting the intentional error with the rest; so that the requisite correction shall always be of one kind, additive or subtractive. Nevertheless this arrangement, as it should be called, would go by the name of an error, simply as being to have its effect afterwards destroyed.

By casual errors, the only ones to which the name of errors can properly be given, are meant those which are absolutely inexplicable, or of which the cause and tendency are equally unknown. They must be considered as equally likely to be positive or negative; so that in the long run the results which they give too great will be compensated by those which are too small. If this be not the case, that is, if there be a greater tendency to too much than to too little, there must be a reason for this phenomenon, and a law of action, which must be sought for and detected. Let us suppose this done, so that any result of a single observation, corrected for all discoverable sources of error, is in itself as likely to be too small as too great.

If all the observations be equally good, the MEAN, or average, is more likely to be true than anything else. This is even true with reference to fixed or personal errors which may remain, but which are totally unsuspected; for there is an even chance of such errors acting in either way. In the article just cited is shown the way of finding, from the observations themselves, the probable error, as it is called, or that which there is an even chance of not exceeding; with references to further sources of information. This article [MEAN], together with the general considerations in PROBABILITIES, THEORY OF, and WEIGHT OF OBSERVATIONS, will contain all we shall find it necessary to say on the subject.

It might be supposed that the greater the number of observations, the less, in the same proportion, the probable error of the average; but this is not true, since the probable error diminishes as the square root of the number of observations increases. Thus, suppose it to be well settled that twenty observations of a given observer will have an average of which it is an even chance that it does not err by (say) a unit: then the same observer must make four times as many observations to get an average with an even chance of not more than half a unit of error; nine times for one-third of a unit, and so on.

Those who neglect sound principles of observation are apt to overrate the effect of multiplying observations; which, though considerable, does not, as we see in the above rule, keep pace with the number of observations.

#### OBSERVATORY. [TRANSIT INSTRUMENT.]

OBSIDIAN (called by the Romans, *Obsidianus Lapis*; by the Greeks, *ὀψιδιανός λίθος*), a mineral, probably of volcanic origin, and so called, as stated by Pliny (*Hist. Nat.*, xxxvi. 26) from a person named Obsidius, who first found it in Ethiopia. This substance occurs in beds, in large and rolled masses and in small grains. Its structure is compact. Fracture large, conchoidal. Hardness 6·0 to 7·0. Scratches glass. Brittle. Colour greenish, greyish, or brownish black. Lustre vitreous. Opaque. Translucent on the edges. Specific gravity 2·34 to 2·39.

Obsidian in the form of little grains of the size of peas, and of a pearly white colour, and consisting of very thin concentric layers, has been found at Marekan in the Gulf of Kamtchatka. It has been called *Marekanite*.

Pliny says that gems and sometimes whole statues were made of obsidian: he also speaks of four elephants of obsidian which were dedicated by Augustus in the temple of Concord. Statues were also made of it by the Egyptians.

Before the blow-pipe, it swells up strongly, and fuses into a transparent glass. It occurs in veins and beds traversing rocks in many parts of Europe, Asia, and America, and in the neighbourhood of most volcanoes.

The analyses of different varieties of obsidian differ considerably: the following analyses of Marekanite and of Obsidian from Cerro de las Navagas, are by Klaproth and Vauquelin respectively:

	Marekanite.	Obsidian.
Silica . . .	77·50	78
Alumina . . .	11·75	10
Soda } . . .	7·00	
Potash } . . .		6
Oxide of Iron . . .	1·25	3·6
Lime . . .	0·50	1
Water . . .	0·50	
	98·5	98·6

OBTUSE, opposed to acute, is applied to an angle which is greater than one right angle and less than two.

#### OBY, River. [SIBERIA.]

OCAÑA, a town of Spain, in the province of New Castile, not far from Aranjuez, and about 30 miles south of Madrid, situated on the high road to Andalusia. On the 19th November, 1819, the Spanish army of Andalusia, about 50,000 strong, commanded by General Areizaga, advanced to Ocaña, and threatened Madrid, which was occupied by the French. The French under Marshal Soult attacked the Spaniards, who fought with great courage, especially the infantry, and at first repulsed the enemy; but after three hours' fighting, the French succeeded in breaking through the Spanish line, which dispersed in the greatest confusion leaving their cannon, baggage, and one half of their men killed or prisoners. Areizaga hurried away with the remainder of his army towards the Sierra Morena. The battle of Ocaña was a most disastrous event to the Spanish cause. The advance of the Spaniards upon Madrid had been effected against the advice of Lord Wellington, who was encamped near the frontiers of Portugal.

#### OCAÑA. [GRANADA, NEW.]

OCCAM, or OCKHAM, WILLIAM, an English scholastic philosopher, was born in the county of Surrey about the end of the thirteenth century. He was a pupil of Duns Scotus, 'the most subtle Doctor,' and, like his master, a member of the order of Franciscans. He himself attained to the title of the 'Invincible Doctor.' He opposed the Realism of Scotus and his followers, and formed a new speculative sect, bearing the name of Occamists, who revived

the tenets of Nominalism. In the early part of the fourteenth century, he taught at Paris. He was distinguished by his powerful opposition to the papal power. A book which he published, entitled 'De Potestate Ecclesiastica et Seculari,' drew down upon him the censure of the pope. He was protected by the king of France, whose cause he had supported against papal encroachments. When afterwards excommunicated by the pope, he found another friend in the emperor of Germany. He died at Munich, in 1347.

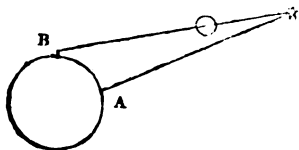
Very little is known of Occam's life. A list of his works, which includes a commentary upon the Predicables of Porphyry and the Categories of Aristotle, and many treatises of scholastic theology and ecclesiastical law, will be found in Fabricius's 'Bibliotheca Latina,' tom. iii., p. 466. Occam's *Summa totius Logice* was published at Paris in 1488, and at Oxford in 1675, 8vo.

Tennemann gives the following account of the Nominalist speculations of Occam:—'He maintained that general ideas had no objective reality out of the mind, because neither the possibility of judgments nor the possibility of a real science requires this hypothesis, and it only leads to absurd consequences. These general ideas have no objective existence but in the mind; they are a product of abstraction; and are either images (*figmenta*) which the mind creates for itself, or subjective qualities belonging to the mind, and which, according to their nature, are the signs of exterior objects. From this doctrine, roughly sketched only, the problem of the principle of individualization came to lose all interest, and the question of consciousness to occupy men exclusively. In the theory of consciousness, Occam diverged still more from the Realist opinion; and in maintaining the subjectivity of thought, he has perhaps given more encouragement than he meant to give to scepticism and empiricism.' (Tennemann, *Manuel de l'Histoire de la Philosophie*; Cousin.)

A few pertinent remarks on Occam and his philosophy are contained in Mr. Hallam's 'Introduction to the Literature of Europe,' vol. i., p. 233.

**OCCULTATION.** This word, which might serve to designate any eclipse of one heavenly body by another, and even the effect of cloud or fog, is particularly applied to the eclipse of a fixed star by the moon. It has been seen [MOON, p. 373] that the spiral course of the moon's real orbit must bring her at some time or other in the course of a revolution of the nodes (18½ years) at or near to every star situated within about 5° of the ecliptic either way. There are consequently continual occultations of stars by the moon; such of which as can be made useful in finding the longitude are given yearly in the Nautical Almanac.

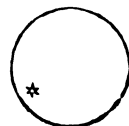
If the moon were (like the star) so distant that two spectators at nearly opposite points of the earth would not be sensibly removed from each other in space when their distance from each other was compared with their common distance from the moon, then all observers, wheresoever situated, would see the moon begin to hide a star at the same instant. They would all then be able to note by their different clocks the absolute instant of the same phenomenon; and [LONGITUDE] their differences of clock-time at this absolute instant would give their differences of longitude. But the proximity of the moon makes it possible that one observer (at A) may see no occultation at the time when such a phenomenon has occurred to another (at B); and makes it certain that



two observers cannot see the beginning of an occultation at the same instant of absolute time. Both therefore must deduce from their own observed times of commencement, and from their knowledge of the moon's place and motions, the times, at their several places, at which a spectator situated at the earth's centre would see the star touch the moon's limb; and this being done, they are in the same position as if the moon had been too distant to require such a process. If, in this work, we had given the details of astronomical calculations, we should not have separated that required in reducing an occultation to the earth's centre from the similar case which occurs in an eclipse of the sun

or a transit of Venus: the principles employed in are identical, though the first process is rendered more simple than the second or third, by the very great distance of the star, which may be considered as marking the point of the heavens at all places. For the value of served occultations in finding the LONGITUDE, see vol. i. p. 143.

Here we might close this article, if it were not for a singular circumstance which sometimes occurs; and which cannot be traced either to the character of the telescope employed, of the observer, of the weather during the observation, or of the particular star under occultation. When the moon approaches the star, instead of an instant of contact followed by disappearance of the star, the latter for a few seconds is frequently thrown upon the moon, as if it were the nearer body, and were going to cross the moon's surface, as Venus does that of the sun during a transit. While this is taking place, which sometimes lasts until the star has fairly left the moon's limb or border, the star serves it light, though it frequently undergoes a change of colour. Aldebaran, whose natural colour is inclining



red, has been seen to present this phenomenon much more frequently than any other star: but  $\theta$  Tauri,  $\theta^1$  and  $\theta^2$  Pliadum, Spica Virginis, Regulus,  $\gamma$  Libræ, 132 Tauri, Cancri, 49 Libræ,  $\lambda$  Aquarii, 249 Aquarii, 187 Sagittarii, Tauri,  $\rho$  Leonis,  $\rho$  Geminorum,  $\delta$  Cancri,  $\delta$  Piscium, &c. have been seen more or less to come upon the moon's limb. See a detailed list of quotations from the different observers in a paper by Mr. South 'On the Occultation of  $\delta$  Piscium by the Moon,' in the third volume of the *Memoirs of the Astronomical Society*. It is to be noted that many of these appearances did not exhibit the whole of the phenomenon, but made the star hang for some seconds upon the moon's limb, instead of immediately disappearing.

The occultations of Aldebaran approaching again in the years 1829 and 1830, the Society just mentioned invited the particular attention of astronomers to them. The consequence was, a large number of communications from different parts of Europe, which are printed in the fourth volume of their Memoirs. Nothing can be more different than the results: some, who had not seen the phenomenon before, saw it for the first time; others, who had seen it before, did not see it; some, who had never seen it before, continued unable to do so. Of six observers at the Royal Observatory, five distinctly saw the projection on the moon's limb, and one saw it hang on the edge of the moon five or six seconds before it disappeared. Of three at the Observatory of Paris, two distinctly saw the projection, and one saw the star disappear instantaneously, leaving a shade ('ombre') on the part of the moon at which it disappeared. The majority saw the star either projected or hanging on the moon's edge. It is to be noted that this phenomenon has been seen, though rarely, at the dark edge of the moon as well as at the enlightened. Its cause is a matter of much diversity of opinion. Some suppose that the moon has an atmosphere close to the surface, which reflects the sun's light and appears opaque like the body of the moon, but is sufficiently transparent to allow the star to shine through it. Others think that certain telescopes give spurious disks to the moon, which inferior instruments certainly do: others again refer it to the eye of the spectator, and think that the impression produced by the star on the retina lasts a short time after the actual disappearance; and one observer states that he saw somewhat different phenomena, according as his attention was directed exclusively to the moon or the star. All these explanations have their difficulties, and are not given very positively. No one of them except that which refers the phenomenon to the eye of the observer will explain why it should sometimes happen and sometimes not, with the same observer and the same instrument; and it is obvious that by supposing a peculiarity of each individual retina for the time being, we do little more than make a purely arbitrary supposition, and one which would serve for any optical difficulty whatever. We need hardly add that no one imagines the star to come between the moon and ourselves.



**OCCUPANCY.** This term in English law signifies the taking possession by any person of any thing which has no owner (Bracton, fol. 8, b), and the general doctrine, as stated in Bracton, is derived from the Jus Gentium of the Roman lawyers, as explained in the *Digest* (lib. 41, tit. 1, s. 1, 3, 5, &c.). That use of the term which will be here explained has reference to the occupation of land.

An estate *pur auter vie*, or for the life of another person or persons, had formerly some peculiar qualities incident to it. If a man had an estate in land for his own life, such estate was of course determined by his death. But if he had an estate in land for the life of another person, and he or his assignee died before such person, the estate was not determined, and yet there was nobody to take it, inasmuch as it could not go to the heir, nor, being a freehold interest, to the executor or administrator. Such an estate belonged to the first person who could take possession of it, and he was entitled to hold it, as general occupant, till the expiration of the life for which it was originally granted. But if the original grant were to A and his heirs, for the life of B, and A died during the life of B, the heir of A took the estate as special occupant, that is, as a person designated in the original grant. Sometimes the heir was said to take the estate as a descendible freehold, though the estate is admitted not to be an estate of inheritance, and therefore not subject to courtesy or dower; it not being perceived that to say an estate is not an estate of inheritance and yet is descendible, is a contradiction, for descent implies an heir who takes as heir. Still it appears from Bracton (fol. 26 b, 62 b) that if lands were given to a man and his heirs for the life of another person, the heir could recover the land by an assise of *mort d'ancestor*, because the ancestor died seised as of fee, and a man could claim by an assise of *mort d'ancestor* any land of which his ancestor was seised as of a fee (*ut de feodo*); and hence it has been concluded that the heir took not as special occupant, but that he took a descendible freehold. This subject of occupancy, general and special, is discussed at great length and with considerable acuteness by Vaughan, Justice. (Vaughan, *Holden v. Smallbrooke*.)

In the case of copyhold, when there was no special occupant, the lord took the estate, for the lord, having the freehold, was also considered to have the possession; and therefore 'vacancy,' the necessary condition to any other person's title by occupation, was wanting. In the case of a rent or other incorporeal hereditament, when there was no special occupant, inasmuch as there could be no entry, there could of course be no possession or title by general occupancy.

It is stated by Bracton, that if land was given to a man for the life of another without any mention of his heirs, the land on the death of the donee did not immediately revert to the donor, unless the donee died intestate, or unless, though he made a will, he had made no mention of his interest in the land as of a term of years, but that if he had disposed of it in his will as of a chattel, such disposition was valid. (Bracton, fol. 27 a. See Doe dem. Blake, 6 T. R., 291.) This power of disposing of a freehold interest in land must have fallen into disuse after the time of Bracton; for it is quite inconsistent with the doctrine of general occupancy as stated by Littleton, and also with the general rule of law, which prevented freehold interests in land from being disposed of by will, before the Statutes of Wills passed in the reign of Henry VIII. But the Statutes of Wills were limited to estates in fee simple, and no power to devise estates *pur auter vie* existed at law before it was given by the Statute of Frauds.

Since the passing of the Statute of Frauds (29 Car. II., c. 3) general occupancy (with perhaps one exception, hereafter mentioned) has ceased to exist. By that statute (s. 12) a man was enabled to devise an estate *pur auter vie* by a will in writing, executed as therein mentioned, and attested by three witnesses; and if no such devise thereof was made, the estate was chargeable in the hands of the heir, if it should come to him by reason of a special occupancy, as assets by descent, as in case of lands in fee-simple; and in case there should be no special occupant thereof, it was declared that it should go to the executors or administrators of the party that had the estate thereof by virtue of the grant, and should be assets in their hands, that is, should be liable to the payment of the testator's or intestate's debts. By the 14 Geo. II., c. 20, s. 9, which recites 'that doubts had arisen, where no devise had been made of such estates, to whom the surplus of such estates, after the debts

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of such deceased owners thereof were fully satisfied, should belong:' it was enacted, 'That such estates *pur auter vie*, in case there was no special occupant thereof, of which no devise should have been made according to the said act (29 Car. II., c. 3), or so much thereof as should not have been devised, should go, be applied, and distributed, in the same manner as the personal estate of the testator or intestate.' These two statutes provided for the case both of a devise being made of an estate *pur auter vie*, and also for the case of the land coming to the heir as special occupant where no devise was made. But an estate *pur auter vie* may be limited either to a man and his heirs, or to a man, his executors and administrators, or to a man simply without mentioning either heirs, executors, or administrators. The Statute of Frauds appears to contemplate the heir only as special occupant, and if there was no devise according to the statute, and no special occupant, which would happen when the estate was limited simply to the grantee, the estate went to the executor or administrator for the payment of debts, and after payment of debts, the surplus was distributed, under the act of George II., in the same manner as the testator had directed the distribution of his personal estate, or it went, in case of an intestacy, to the next of kin of the intestate. But when no devise was made according to the statute, and the estate was limited to the grantee, his executors and administrators, inasmuch as the heir could not in that case be special occupant, the question arose, if the executor or administrator could be such occupant, and if he could, the further question arose, Who was to have the estate after payment of debts? The proper construction of the two statutes seemed to be that the heir only could be special occupant, and that he alone could take as such. If then the land were not devised according to the Statute of Frauds, and there was no special occupant, by reason of the limitation being simply to the grantee, or to him, his executors, and administrators, the executor or administrator would take it under the Statute of Frauds, and distribute it, after payment of debts, under the statute of George II. The executor or administrator took the estate as a freehold, which it is, but in trust for the persons entitled under a will, which was sufficient to pass personal estate, or, in case of intestacy, in trust for the next of kin. (See the opinions of Lord Redesdale, in *Campbell v. Sandys*, 1 Sch. and Lef., 288; and the opinions of Lord Eldon, in *Ripley v. Waterworth*, 7 Ve., 425.)

If a man dies intestate who is seised of an estate for another's life, and the limitation is such that the estate cannot go to his heir as special occupant, the estate seems open to a general occupancy until an administrator is appointed; but such administrator seems to have a title by relation.

Neither the Statute of Frauds nor that of George II. applied to copyholds, and therefore not to estates *pur auter vie* in copyhold lands.

Estates *pur auter vie*, whether there shall or shall not be any special occupant thereof, and whether the same shall be freehold, customary freehold, tenant right, customary or copyhold, or of any other tenure, and whether the same shall be a corporeal or incorporeal hereditament, are now devisable by a will in writing executed in the manner prescribed by the statute of 1 Vic., c. 26, which repeals, among other clauses, that part of the Statute of Frauds which relates to estates *pur auter vie*, and also the 9th section of 14 Geo. II., c. 20. And if no disposition by will is made of any estate *pur auter vie* of a freehold nature, the same shall be chargeable in the hands of the heir, if it shall come to him by reason of special occupancy, as assets by descent, as in the case of freehold land in fee simple; and in case there shall be no special occupant of any estate *pur auter vie*, it shall go to the executor or administrator; and if the same shall come to the executor or administrator either by reason of a special occupancy or by virtue of that act, it shall be assets in his hands, and shall go and be applied and distributed in the same manner as the personal estate of the testator or intestate. This statute settles a number of questions, some of which have been already referred to, which were of frequent occurrence, with respect to estates *pur auter vie*.

On the subject of Occupancy, the reader may consult Puffendorf, *Law of Nature and Nations*, iv., c. 6.

OCEAN (a Greek word, *Okeanos*, *Ὠκεανός*) is a term used to indicate the extensive bodies of salt-water which cover the greater part of the earth's surface. The word first occurs in Homer, who uses it to designate the river

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stream which, according to his ideas, surrounded the surface of the earth like a circle. The Greek geographers however knew that the ocean was a wide expanse of water, which surrounded the land, and the term ocean was used by them in this sense. They supposed that it penetrated deep into the mass of the continent by four great bays or seas: these were, on the south the Arabian Sea and the Persian Gulf; on the west the Mediterranean; and on the north an imaginary strait which connected the Northern Ocean with the Caspian Sea. (Strabo, p. 121; Pomp. Mela, i. 1.)

The proportion between the surface of the solid and watery surface of the earth is differently stated. Darby, in his 'View of the United States,' calculates the water-surface to be 160,152,000 square miles, and the land only at 38,840,000 square miles: if this be correct, the land does not amount to one-fourth of the entire superficies of the earth. Some German geographers however are of opinion that the land-area is fully equal to one-fourth of the whole surface, and perhaps a small fraction more.

Several parts of the ocean are distinguished by peculiar names. The widest expanse of salt-water is that which extends between America on the east, and Asia and Australia on the west, and is called the Pacific Ocean. Its boundary-line is pretty well determined by the adjacent continents, which approach one another towards the north, and at Behring's Strait, which separates them, are only about 36 miles apart. This strait may be considered as closing the Pacific on the north. Towards the south both continents are widely separated from one another, and both terminate at considerable distances from the Antarctic Pole: America, in 56° S. lat.; and Tasmania, or Van Diemen's Island, which is an appendage of Australia, between 43° and 44° S. lat. The boundary-line of the Pacific must here be marked by lines drawn from Cape Horn, the most southern point of America, and from South-West Cape, the most southern extremity of Tasmania, to the Antarctic Pole. The expanse of water contained within these boundary-lines is estimated at 100,000,000 of square miles, or nearly half the superficies of the earth.

The ocean which extends between Europe and Africa on the east, and America on the west, and is called the Atlantic, may also be considered as being closed on the north by a strait, but it is one of considerable width. This strait is formed by the northern coast of Norway and the eastern coast of Greenland, which two countries are nearly 900 miles apart, between 68° and 71° N. lat. Towards the south the Atlantic extends to the Antarctic Pole, where it is divided from the Pacific by a line drawn from Cape Horn to the Pole. As Africa projects much farther to the south than the countries to the east of it, that portion of the sea which is east of Africa is not included in the Atlantic; and the eastern boundary-line of this ocean is here considered as formed by an imaginary line drawn from Cape L'Agulhas, the most southern extremity of Africa, to the Antarctic Pole. Within these boundaries the Atlantic, including its numerous seas, as the Mediterranean, the Black Sea, the Baltic, Hudson's Bay, and the Columbian Sea, is estimated to cover an area of nearly 30,000,000 of square miles.

That portion of the ocean which is separated on the east from the Pacific by a line drawn from South-West Cape, and on the west from the Atlantic by a line drawn from Cape L'Agulhas, is called the Indian Ocean. Its surface, including the Red Sea, Persian Gulf, Bay of Bengal, &c., is supposed to occupy more than 25,000,000 of square miles.

The northern coasts of Europe, Asia, and America do not extend to the Arctic Pole, but terminate between 70° and 80° N. lat. Between these coasts is a sea, which may be about 2000 miles across from one continent to the other. This sea is called the Arctic Ocean, or Icy Sea. The latter term has been applied to it from the circumstance of its being encumbered with heavy masses of ice all the year round. This sea is connected with the Pacific by Behring's Strait, and with the Atlantic by the wide strait between Greenland and Norway. Its area is estimated at about 4,000,000 of square miles.

OCEANIA. [PULMOGRADA.]

OCEANUS, De Montfort's name for the umbilicated form of Nautilus. [NAUTILUS, p. 113.]

OCELLARIA. [POLYPIARIA MEMBRANACEA.]

OCELLUS LUCA'NUS, 'Οκελλος ὁ Λευκανός, a Pythagorean philosopher, was a native of Lucania in Italy, and is supposed to have been a disciple of Pythagoras; but the

time in which he lived is uncertain. He wrote many works on philosophical subjects, the titles of which are given in a letter written by Archytas to Plato, which has been preserved by Diogenes Laertius (viii. 80): but the only work of his which has come down to us is 'On the Nature of the Universe,' *Περὶ τῆς τοῦ παντὸς φύσεως*. This work, as we learn from the extracts in Stobæus, was originally written in Doric Greek, and appears to have been transferred in later times into the common Greek dialect. Its chief philosophical topic is to maintain the eternity of the universe (*τὸ Πάν*); Ocellus also attempts to prove the eternity of the human race (c. 3, s. 3).

The best editions of Ocellus are by Batteux, Par., 1768, 3 vols. 12mo., and by Rudolphi, Leip., 1801, which is accompanied with a valuable commentary. The work has been translated into French by the Marquis D'Argens, Berlin, 1762, and by the abbé Batteux, Paris, 1768; and into German by Bardili, and by J. G. Schulthess, Zürich, 1781, 8vo. OCELOT. [TIGERS.]

OCHILL HILLS, are a system of hills, or rather mountains, in Scotland, the principal ridges of which are situated between 56° 10' and 56° 20' N. lat. and between 3° 30' and 3° 50' W. long., but the lower ridges extend eastward through the peninsula of Fife between the Frith of Forth and that of the Tay, and terminate a few miles from the North Sea.

The Ochill Hills begin on the west about three miles north-east of the town of Stirling, and on the north side of the road which leads from that place to Alva. Their western edge has the form of a segment of a circle, with its convexity turned to the north-west, and lying nearly parallel to the course of the river Allan, which flows about four miles from the base of the hills. Where this river descends from the hills, the outer edge of the mountain-mass begins to lie nearly due west and east, and continues in this direction until it passes 3° 30' W. long., whence it continues in an east-north-east direction to the shores of the Frith of Tay and along this frith to the vicinity of Port-on-Craig Ferry. In all this line, which is nearly 40 miles, the Ochills form a continuous mass, and rise from a comparatively low and flat country, which along their western base is called Strathallan, and along the northern, Strathearn. At the foot of the mountains there are elevated moors. The declivity is steep, especially where the mass extends east and west, and in some parts near the base of the mass the sun is not seen for three months in the year. The elevation west of 3° 30' probably exceeds, on an average, 1000 feet above the sea-level, but the mountains do not rise into peaks or elevated summits. East of 3° 30' they sink lower, but maintain in general a height of 500 to 1000 feet. The summit of Norman's Law, south of Flisk, on the Frith of Tay, is supposed to be 1500 feet above the sea.

The width of this mountain-mass varies greatly. From its western extremity to near 3° 30', a space of about 12 miles in length, it is on an average six miles wide. This area is occupied by one mass of rocks, with the exception of a deep narrow valley which traverses the mass in its whole length, and in which the river Devon runs from west to east. The valley, as far down as the church of Muckhart, is hardly more than two furlongs wide in any part, though it widens to half a mile below that place. The mountain-masses to the south of the valley are much higher than those which are north of it, and the highest portion of the Ochill Hills, Ben Cloch, attains the elevation of 2359 feet above the sea, and several other summits rise to more than 1500 feet. Both mountain-masses are furrowed by narrow ravines, through which the waters descend to the Devon. The southern mountains terminate in the great bend of the Devon, called the Crook of Devon. The width of the ridge which is north of the upper course of the Devon is much less, and probably in no part exceeds two miles, and it grows still narrower as it approaches the Frith of Tay. Its prolongation along the southern shore of that bay is probably only half a mile wide. Another ridge which runs south of this must be considered a lateral ridge of this prolongation. It branches off near 3° 15' W. long., south of Newburgh, encloses the small lake called Loch Lindores, and extends in a general east-north-east by east direction through the peninsula of Fife, terminating east of Logie, about five miles from the North Sea in the Inchlaw hill, which is about 600 feet high. The highest summits of this ridge probably do not exceed 700 feet, and in many places the range hardly attains 300

**feet.** The western part of the valley, between this ridge and that along the Frith of Tay is narrow, but towards the east it widens; between Creig and Kilmany it is four miles wide.

The mountains just described constitute what are generally called the Ochill Hills. But to the south of them several groups and ridges traverse the counties of Fife, Kinross, and Clackmanan, which may be considered as dependencies of the Ochills, though they are separated from them by depressions of considerable width. Such a depression occurs to the north of Loch Leven, between the Ochill and Lomond Hills. The high grounds called the Braes of Orwell, which connect both ridges across this depression, gradually rise from Milnathort to about 450 feet above the sea, and 120 feet above Loch Leven, and descend northward into Strathmiglo. This depression is about 4 or 5 miles wide. On the eastern side of it, West Lomond Hill, or Bishop's Hill, rises precipitously to an elevation of 1721 feet above the sea. A ridge not exceeding 1000 feet in height unites it with East Lomond Hill, which attains the elevation of 1466 feet. Both Lomonds are about 5 miles apart. High grounds extend southwards from the southern declivity of West Lomond Hill to the very banks of the river Leven near its efflux from Loch Leven. A high tract runs eastward from the eastern base of East Lomond Hill, and in some places rises into hills, the most elevated of which are Down Hill, Clatto Hill, and Largo Law; the last is 952 feet above the Frith of Forth, from which it is only two miles distant. From Largo Law a ridge of high ground runs north, terminating east of Kembach, about one mile from the banks of the Eden, and two miles from the shores of the sea, and another east by north, terminating north of Dunino, about 2 miles from the sea. The general elevation of these ridges may be about 300 feet, and some hills are higher. The country enclosed by these ranges may be from 20 to 80 feet above the sea, a height which it maintains to the shores, except, on some bays, which are enclosed by sandy and level plains.

South of Loch Leven, and only half a mile from its shores, is the Benarthy Hill, which rises very gradually from the east and terminates abruptly on the west. Its elevation probably exceeds 1000 feet above the sea. Its eastern declivities, which are gentle, approach the river Leven near its efflux from the lake, and two moderately elevated ridges of high ground run eastward between the Leven and Orr rivers, and enclose the valley of the Lochty, terminating near its confluence with the Orr. No elevated hills occur on these ridges. From the western extremity of the Benarthy Hill an elevated tract stretches southward to the eastern extremity of the Cleish Hills, but probably is not much more than 500 feet above the sea. The Cleish Hills, which extend nearly 6 miles east and west, form the boundary-line between Kinross and Fife. They rise to a considerable elevation; the highest summit, Mount Dumbglow, is 1215 feet above the sea-level, and three others, called the Ingans, rise respectively to 1030, 1060, and 1048 feet.

The Saline Hills are west of the Cleish Hills, and separated from them by a narrow but rather deep depression. They cover a large surface, being 4 miles long from north to south, and more than two from east to west. They also rise to a considerable elevation, but we are not aware that their height has ever been determined. They may be considered as the nucleus from which the high grounds branch off that traverse Fife, south of the Orr river, and Clackmanan, south of the Devon. The elevated ground between the Orr river and the Frith of Forth extends nearly parallel to the course of the river, east and east-north-east, and terminates between Dysart and Wemys, about a mile from the sea. Except a few hills near Beath, called Beath Hills, it rises only to a moderate elevation, but a high tract of considerable width extends from Beath Hills southward, and terminates, between Aberdour and Kinghorn, in several hills of considerable elevation, as Dunearn Hill (695 feet), Orrock Hill, and the Bin (625 feet); the last-mentioned elevation stands north of Burntisland, half a mile from the sea. The western ridge of high land, which extends through Clackmanan, is rather elevated near the Saline Hills, but gradually decreases as it advances farther west. It terminates in the vicinity of Tillibody, where the Devon river turns to the south, and it contains no high summits.

The Ochill Hills consist chiefly of porphyry and amygdaloid, but the hills which enclose them on the south belong to the coal formation, and are principally composed of lime-

stone, sandstone, ironstone, clay, slate, bituminous shale, greenstone, basalt, and trap-tufa. This district contains one of the most extensive coal-beds in Scotland. It begins on the east in the parish of Dunino, about 6 miles west of Fifeness, and extends to the mouth of the river Devon. The richest part of this coal-field is stated to be between Dysart and Alloa. It is worked at several places. Iron-ore abounds likewise in this tract, and is also worked. As to the other useful minerals, see FIFESHIRE. The lower hills and declivities are cultivated, and the higher hills make excellent pasture-grounds. The whole of this hilly region is destitute of trees, except where they have been planted: the plantations consist of oak, ash, larch, elm, beech, spruce, silver and Scotch fir. (Sinclair's *Statistical Account of Scotland*; *New Statistical Account of Scotland*.)

OCHNA'CEÆ form a very small natural order of plants nearly allied to Rutaceæ, and remarkable for their fleshy carpels being elevated upon an enlarged succulent receptacle. They are shrubs, inhabiting the tropics of either hemisphere, with shining evergreen leaves, showy yellow flowers, with five or ten stamens, whose anthers open by pores at the point. They appear to be possessed of tonic and astringent qualities. (Lindley's *Natural System of Botany*, ed. 2, p. 129.)

OCHRA, or OKRO, a plant of which the fruit is used as a vegetable in the West Indies, the United States, and in South America, and which is remarkable for the similarity of its name to the vegetable called *Ochra* by the Greeks, but which has not been ascertained by botanists. The names by which the produce of the New World is distinguished in the works of Marcgrave and Piso are *Quangombo* and *Quigombo*, and in later works by that of *Gombo*, and *Gombaut*, or *Gombeau*. It is possible therefore that a classical name, which was not otherwise engaged, may have been applied to a new vegetable, and, as has been the case in other instances, without any attempt being made to identify the plant named with that which had been described by classical authors.

The okro has been already alluded to under *Hibiscus*, to which genus it belongs, and is the *H. esculentus* of botanists, which is very closely allied to *H. Abelmoschus*, now *Abelmoschus moschatus*, so long noted for its musk-scented seeds, and which by Browne, in his 'Nat. Hist. of Jamaica,' is called *Musk-okro*. The former is characterised by having a thick unarmed herbaceous stem, leaves cordate at the base and palmate, or divided into five rather obtuse lobes, dentate at the margin, involucre ten-leaved, deciduous petioles longer than the flowers, with the calyx bursting longitudinally. The fruit is from 2 to 4 inches in length, pyramidal in form, furrowed, and filled when in a green state with a large proportion of mucilage, on which account it is esteemed both when cooked as a vegetable, and as an addition to make soup viscid, in the country where it is indigenous, as well as in the South of France and the Levant. A similar but distinct species is employed in the East Indies for the same purpose, whence it has probably been introduced into Africa, as a similar plant is described as being cultivated there, and the fruit employed for the same purpose. The seeds may be added like barley to soups, and have been recommended to be roasted as a substitute for coffee.

OCHRE, hydrated sesquioxide of iron. [IRON.]

OCHROITE. [CERIUM, ORES OF.]

OCHSENHAUSEN is a principality in the circle of the Danube, in the kingdom of Würtemberg, about 56 square miles in extent, with a population of 6000 inhabitants. It formerly belonged to a Benedictine abbey: the abbot was raised by the emperor Francis I., in 1740, to the rank of a prince of the Empire. In the year 1803, the greater part of it was assigned as an indemnity to Prince Wenzel Lothar von Metternich (the Austrian high-chancellor), but of the revenue, amounting to 70,000 florins, he is bound to pay over 20,000 florins for certain purposes.

The town of Ochsenhausen, situated on the river Rottum, in 48° 4' N. lat. and 10° E. long., has 1400 inhabitants. The fine buildings of the ancient Benedictine abbey, and the church, which is distinguished for its size and beauty, are looked upon as the chief ornaments of that part of the country. These buildings are now, under the name of Winneburg, the residence of the prince.

OCKLEY, SIMON, was born at Exeter in 1678, entered Queen's College, Cambridge, in 1693, was presented to the vicarage of Swavesey in 1705, was chosen professor of Arabic in the university of Cambridge in 1711, and died at Swavesey, August 9, 1720.



Ockley had paid great attention to the study of the Oriental languages, and was well acquainted with the Arabic. His principal work, 'The History of the Saracens,' which was originally published in two volumes 8vo., the first in 1708, and the second in 1718, was compiled from Arabic manuscripts in the Bodleian library at Oxford. This work, which commences at the death of Mohammed, and terminates in the year 705, contains much valuable information respecting the early conquests of the Arabs, and may still be consulted with advantage by those who are unacquainted with the Oriental languages. Gibbon made considerable use of it in his 'Decline and Fall,' and speaks of the author in his autobiography as 'an original in every sense, who had opened his eyes.' This work however does not appear to have brought Ockley much profit; for he complains, in his inaugural oration, in 1711, of his straitened circumstances, and dates the second volume of his history from Cambridge Castle, where he was imprisoned for debt.

Ockley wrote several other works, of which the principal are:—'Introductio ad Linguas Orientales, in qua iis discendis via munitur, et earum Usus ostenditur,' 1706; 'The History of the present Jews throughout the World,' 1707, translated from the Italian of Leo of Modena, a Venetian Rabbi; 'The Improvement of Human Reason exhibited in the Life of Hai Ebn Yokhdan,' 1708, translated from the Arabic; 'An Account of South-west Barbary,' 1713; a new translation of the second 'Apocryphal Book of Esdras,' from the Arabic version of it, 1716.

OCOOCH HILLS. [MISSISSIPPI River.]

O'CREA (a boot) is a term used in descriptive botany to express those kinds of stipulæ which grow together by their back and front edges in such a way as to form a tube, through which the stem passes. The genera Polygonum, Rheum, and Rumex offer a common illustration of this structure.

OCTAGON. [POLYGONS, REGULAR.]

OCTAHEDRON. [SOLIDS, REGULAR.]

OCTANS (the instrument commonly called a quadrant, which, when on Hadley's construction, is of the form of an octant, or eighth part of a circle), a constellation of Lacaille, situated at the south pole, which it includes. The principal stars are as follows:—

Character.	No. in Catalogue of		Magnitude.
	Lacaille.	Astron. Society.	
$\delta$	1190	1609	5
$\alpha$	1686	2472	5
$\beta$	1811	2700	5
$\gamma^1$	1917	2849	5
$\gamma^2$	1921	2861	5
$\gamma^3$	1940	10	5

OCTANTS. [SYZYGIES, &c.]

OCTAVE (*Octavus*, Lat.), in Music, the eighth note of the scale, the most perfect of concords, whose ratio is 2 : 1, therefore the simplest of all the sounds, except the unison. The harmonics of the octave and unison agree invariably, a coincidence which occurs in no other interval, and these sounds have so close a resemblance, that in combination they are hardly distinguishable, the one from the other. The following are the properties, says Rousseau, which so singularly distinguish the octave from all other intervals:—The Octave embraces all the primitive sounds, that is to say, all the original tones and semitones. Hence, after having established a system or series of notes within the limits of an octave, if it be wished to extend this series it will be absolutely necessary to follow the same order in a second octave, in a third, or a fourth, &c., and no sound will be found in any of these but what is, as it were, a recurrence of some one in the first series. It is in virtue of this property in the Octave that the term *Diapason* was applied to it by the Greeks. [DIAPASON.]

The Octave has also another remarkable property, the same writer observes, namely, that it may be doubled, tripled, and multiplied at pleasure, without changing its nature. This multiplication, however, is limited as relates to its effect on the ear, and an interval of eight octaves, for instance, would be scarcely, if at all, appreciable as such by

the auditory organ. A double Octave is less agreeable than a single one; a triple Octave loses still more of its pleasing quality; till, by increasing the distance, the relationship of the sounds becomes nearly undistinguishable.

OCTAVE, THE RULE OF, or what the French call *La Règle de l'Octave*. [ACCOMPANIMENT of the Scale.]

OCTA'VIA. [ANTONIUS, M.]

OCTHO'SIA. [CIRRIPEDA, vol. vii., p. 209.]

OCTOBER, in the year of Romulus, was strictly what its name implies, the eighth month. With us it is the tenth. Suetonius tells us that Domitian, who was born in this month, gave it his own name (Sueton., *Domit.*, c. 13); but it lasted during his life only (Plutarch, *Num.*, p. 72; Macrobius *Saturnal.*, i. 12). Antoninus Pius, in honour of his wife Faustina, called it 'Faustinus' (Julius Capitolinus, c. 10); and the flatterers of Commodus assigned to it one of their patron's epithets, 'Invictus.' (Ælius Lamprid., ed. Lugd. Bat., 1671, p. 507.) Our Anglo-Saxon ancestors called it *se teothu monath*, the tenth month; they also gave it the name of *Winter-ŷylth*, winter-beginning. (Bosworth, *Sax. Dict.*, v. 'Monath.')

OCTO'CERA, M. de Blainville's name for the first family of his order *Cryptodibranchiata*, containing the genus *Octopus*.

OCTOLASMIS, Mr. Gray's name for a genus of Cirripeds (*Heptalasmis*, Leach).

OCTO'MERIS. [CIRRIPEDA, vol. vii., p. 210.]

O'CTOPUS. [CEPHALOPODA; SEPIADÆ.]

OCUL'NA. [MADREPHYLLICÆ.]

O'CYMUM, a genus of labiate plants, remarkable for the fragrance of their leaves, which are used as an ingredient in savoury dishes, on which account some of the species have from time immemorial been objects of very general cultivation. In English gardens they are called Basils, a corruption of Basilisca, the name given to common basil by the monkish writers upon plants, in allusion to its regal qualities.

Of common basil (*Ocimum Basilicum*, Linn.) there are many varieties, differing in their size, in the form and colour of their leaves, and in minor particulars: in their qualities they are nearly alike. This species is found wild in the hotter parts of the East Indies, where it is a perennial, with a woody root; but in our gardens it is treated as a tender annual, being raised in the spring in a hot-bed, and turned into a warm border when the summer is so far advanced that there is no longer any danger from frost, which is instantly fatal to such plants. Besides this Mr. Bentham enumerates forty-three other species (*Labiatarum Genera and Species*, p. 18), one of which, the *O. viride*, is used as a febrifuge in Sierra Leone. The genus is readily known by its calyx being bent downwards when the fruit is ripe, and then appearing covered as it were by a very large ovate dorsal lobe, and by the stamens being declinate.

OCYPO'DIANS, a tribe of *Brachyurous Crustaceans*, placed by M. Milne Edwards between the *Pinnotherians* and the *Gonoplacians*.

*Character of the Tribe*.—Carapace rhomboidal or trapezoidal, very much elevated anteriorly and depressed posteriorly; the frontal border occupying the whole width, and the *front*, which is lamellar and bent down to the *epistome*, extremely narrow; its width does not equal a third of the length of the eyes, nor the half of the width of the buccal frame, which itself is very narrow. The *eyes* are very long and the *cornea*, in general, is very large. The basillary joint of the *internal antennæ* is oval, rather large, and placed vertically in the anterior angle of the orbit; the moveable stem of these appendages is extremely small and hidden under the front; the two terminating filaments are very short, large, and hardly annulated, a disposition which is not observed in any of the crustaceans previously treated of in the system of M. Milne Edwards, except in the *Dotos*. The *external antennæ* are rudimentary, and situated, as they ordinarily are, in an opening of the internal angle of the orbit; their first joint is less than the second, and the third only reaches to the edge of the anterior border of the basillary joint of the internal antenna. The *epistome* is continuous with the lower border of the orbit, and the buccal frame is remarkably more narrow anteriorly than it is posteriorly. The *external jaws* close the mouth completely; the interior border of their lamellar portion is straight; their third joint is very much elongated, and their fourth inserted at the external angle of the preceding. The *sternal plastron* has a trapezoidal form, the

base of which is directed backwards; it is strongly curved in its longitudinal direction, and gives passage to the male organs at a considerable distance from its external border. The anterior feet are, generally, compressed and of very unequal size; the rest are very long and exhibit no great difference between themselves; the terminating joint is often depressed, but has never the form of a natatory oar. The *abdomen*, composed ordinarily of seven distinct segments in both sexes, is very narrow. In general it does not cover more than a third of the posterior portion of the sternal plastron of the male, and even in the female leaves that part of the plastron which approaches the base of the feet exposed. In the greater part of the cases, if not always, there are only seven *branchiæ* on each side of the thorax, five of which only are couched under the vault of the sides, and two reduced to the state of vestiges only, and fixed to the jaw-feet. (M. Edwards.)

**Locality and Habits of the Tribe.**—The Ocypodians, as their name implies, are very swift runners, living nearly always on the strand, where they dig holes for themselves.

M. Milne Edwards, who remarks that this small and very natural group is closely allied to the genera *Doto* and *Mycteris* among the Pinnotherians, thus divides the tribe:—

Tribe of Ocypodians.	Cornea transparent, very large, oval, occupying at least the half of the length of the ocular peduncles, and commencing very near the base of those stems	Ocypoda.
	Cornea transparent, very small, rounded, not occupying the fourth part of the length of the ocular peduncle, and only commencing close to its extremity.	

Ocypoda. (Fabricius.)

**Generic Character.**—*Carapace* rhomboidal or even nearly square, and nearly as large behind as before; its upper surface, which is nearly transversely horizontal, but a little curved in a longitudinal direction, is strongly inclined downwards and backwards; its anterior and lateral surfaces are very much elevated and nearly vertical, and these last are divided into two portions by an elevated vertical line which terminates between the base of the third and fourth pair of feet. The *front* is much longer than it is wide; it does not cover the articulation of the ocular peduncles, and only equals in width the half of the epistome, to the anterior border of which it unites itself. The orbits are very large, not deep, and divided into two distinct portions, one internal or foraminal, which gives insertion to the ocular peduncle, and which in the *Cyclometopes* and *Oxyrhynchi* is always hidden under the front; the external portion serves for the lodgment of the major part of the eye and its peduncle. The upper border of these cavities, which is much less advanced than the lower, presents a disposition which accords with this division, for it describes two curved lines which unite in forming an angle, the summit of which is directed forwards. The form of the *eyes* is also very remarkable; the cornea is oval, very large, and extends below within a very small distance of the base of the peduncle; but in

general this last is prolonged beyond its extremity, so that the eyes terminate with a kind of horn, the length of which seems to increase with age. The *internal antennæ* are disposed as stated in the character of the group; the *external antennæ* are rudimentary; their third joint is not half so long as the second, and their terminal stemlet is scarcely longer than their peduncle. The *epistome* is very small and presents at its median part a small quadrilateral prolongation which is soldered to the front. The third joint of the *external jaw-feet* is quadrilateral and much smaller than the preceding; it never hides the sort of appendage formed by the three succeeding joints, and the palp which occupies the external border of these members is styliform and deprived of a multi-articulate terminal filament. The *anterior feet* are, in general, shorter than the rest, and the hand which terminates them is much compressed and very large in comparison with the arm: the difference between the hands of each side is often very great, especially in the male. The succeeding feet are also much compressed, and increase in length up to the fourth pair inclusively; these last are about thrice the length of the post-frontal portion of the *carapace* and the posterior feet are much shorter; the tarsi are always compressed and nearly of the form of a small spatula, and at the basilar joint of the third and fourth pair there is a sort of articular surface surrounded with hairs, which seems destined to diminish the friction of these two members against each other. The *abdomen* is much narrower at its base than the posterior part of the thorax, and, in both sexes, leaves a considerable portion of the last segments of this part of the body exposed; in the male, it has a triangular, elongated form, and advances to the anterior extremity of the plastron; in the female its last segment is not a fourth as large as the preceding, and is ordinarily received in a notch of its anterior border. The first pair of abdominal appendages, in the male, are very much developed, cylindrical and slightly hooked towards the end; the second pair are, in general, rudimentary.

The *branchia* which ordinarily exists on the antepenultimate joint of the sides is wanting in the *Ocypodæ*; the others are directed very obliquely backwards, and the branchial cavity is elevated so as to leave above a great void space which is lined by a membrane more or less spongy. (M. Edwards.)

**Habits of the Genus.**—So rapid are the *Ocypodæ* in their motions, that those who have observed these animals in their native haunts declare that they run so fast that a man can hardly overtake them. They hollow out holes for themselves in the sand of the sea-bank, and remain shut up in their burrows throughout the winter.

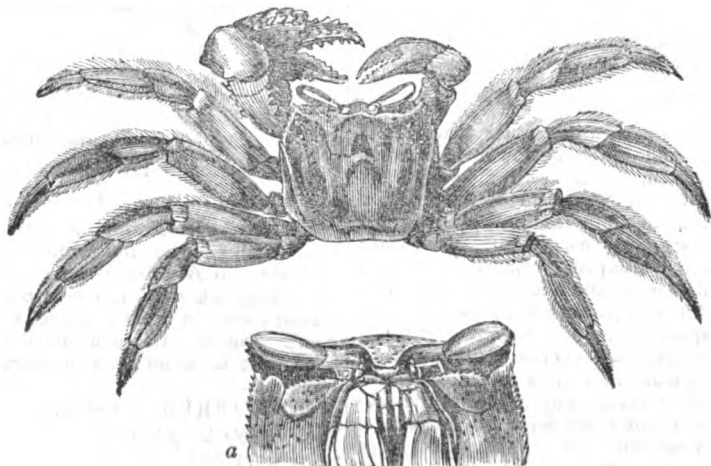
**Geographical Distribution.**—The warm climates of both hemispheres.

M. Milne Edwards records seven recent species, which he separates into two divisions, observing, at the same time, that the species are difficult to distinguish on account of the changes which age produces on the form of these crustaceans.

#### A.

Species whose transparent cornea occupies the extremity of the ocular peduncle, and is not overpassed by a styliform prolongation or a terminal tubercle.

Example, *Ocypoda arenaria*, *The Sand-Crab* of Castet.



*Ocypoda Arenaria.* a, under side of the head. (M. Edwards.)

Length about two inches; colour yellowish.

**Locality.**—The coasts of North America and the Antilles.

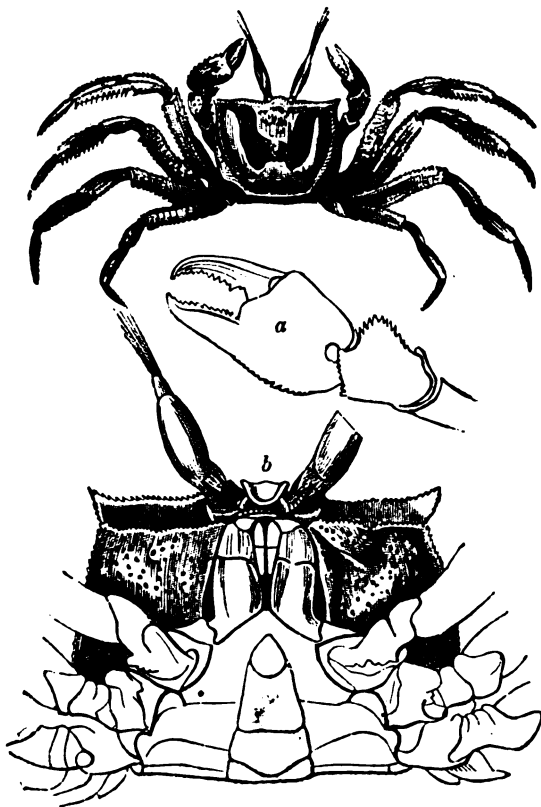
**Habits.**—This species lives in holes three or four feet deep, which it hollows out in the sand immediately above the level of the wash of the sea. Its general time of quitting the burrow to seek its food is the night, and when pursued it runs with great swiftness, elevating at the same time its claws in a menacing manner. This is their summer life; but towards the end of October they retire inland to hibernate in the earth. When they have found a place proper for their purpose, they dig a hole like that which they had occupied on the edge of the sea; and, after entering therein, stop up the entrance so cleverly that no trace of its existence is left. Then they retire to the bottom, and there remain till the warm weather brings them forth, when they again repair to their marine residences.

### B.

Species whose eyes carry at their extremity an appendage, in the form of a tubercle, cylinder, or stylet, which overpasses the transparent cornea.

Example, *Ocypoda hippea*. Terminal appendage of the eyes large, short, conical, and furnished at its extremity with a pencil of long hairs. Length, two inches, French.

**Locality.**—Syria, Egypt, Cape de Verd, &c.



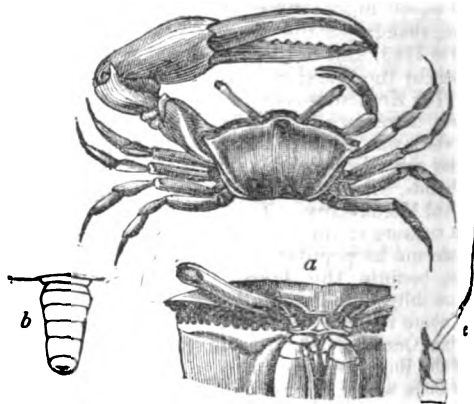
*Ocypoda hippea*.  
a, plucer; b, under side of male, in detail. (M. Edwards.)

### Gelasimus.

**Generic Character.**—Carapace much wider than that of *Ocypoda*, more convex, and much narrower backwards. Stomachal region very small, and genital region generally very large. Disposition of the front and of the internal antennæ nearly the same as in the preceding genus; ocular peduncles, on the contrary, very narrow, and the cornea which terminates them not occupying more than its fifth part; upper border of the orbits much less projecting than the lower; not divided into two portions as in the *Ocypodæ*, and convex nearly throughout its length; external extremity of those cavities largely open, and communicating with a furrow which is obliquely directed behind and downwards. **External Antennæ** much more developed than in the preceding genus. The external jaw-feet have the same form as the *Ocypodæ*. The anterior feet, in general, very small in the female; but, in the male, one of them acquires enormous dimensions. Sometimes it is the right, sometimes

the left claw which grows to this great size, being, in certain instances, twice as large as the body. The claws of the small anterior foot are enlarged and lamellar towards the end, a little contorted; those of the great anterior foot are and elevated, and slightly dentated on the edges. The small feet are moderate, and present nothing remarkable. The same remark applies to the abdomen.

M. Milne Edwards, who gives the above character, states that Mr. Thomas Bell had informed him that some *Gelasimi* have at a certain age, if not always, a stylet at the extremity of the ocular peduncle, on the side of the great claw, whilst the eye of the opposite side always retains its ordinary form.



*Gelasimus annulipes*. (Indian Seas).  
a, under side of head; b, abdomen; c, antenna. (M. Edwards.)

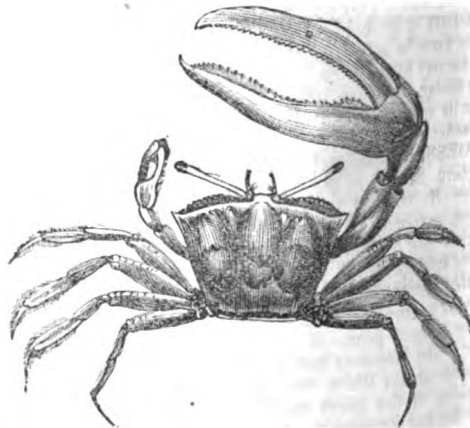
**Geographical Distribution of the Genus.**—The various countries in both hemispheres.

**Habits of the Genus.**—The *Gelasimi* live in holes near the edge of the sea, in pairs, and the great claw of the male is used to stop the entrance of the hole.

The species are numerous; but they, as well as the *Ocypodæ*, are difficult to be distinguished, because the parts which differ the most, namely the front and the great claw, change their form with the progressive age of the animal.

Example, *Gelasimus Marionis*. Length about 8 lines; width about an inch, French.

**Locality.**—Manilla.



*Gelasimus Marionis*.

### FOSSIL OCYPODIANS.

#### Gelasimus.

The fossil species which most resembles *Gelasimus Marionis* seems to be *Gelasimus nitidus*, figured by M. Desmarest in his *Histoire Naturelle des Crustacés fossiles*, but the lateral edges of the carapace in the fossil are quite smooth, and the front is terminated by a very short sharp point. Neither the geological nor geographical locality appears to be known. The specimen is in the Paris museum.

OCYPTERUS. [SHRIKES.]

OCYRÖE. [CILIOPODA, vol. vii., p. 165.]

OCYTHÖE. [CEPHALOPODA; PAPER NAUTILUS.]

OCZAKOW, a Russian town in the government of

**Kherson**, is situated in 46° 37' N. lat. and 31° 30' E. long., on a small brook near the mouth of the river Dniéper, which is here about four miles and a half wide between Oczakow and Kinbourn. Oczakow, though never a large place, was formerly one of the most important fortresses in this part of the country, and had a citadel, the walls of which were twenty-five feet high. The population was at that time 5000. It is chiefly remarkable for the importance that was attached to it in the wars between the Turks and the Russians in the last century. In 1737 it was taken by storm by the Russians under Count Munich, but with the loss of 18,000 men. In the same year a Turkish army of 70,000 men attempted to recover it, but was repulsed with the loss of 20,000 men. The Russians, having razed the fortifications, abandoned the place in 1738. The Turks re-occupied it in 1743, and held it till 1788, when, after a six months' siege by the Russians under Suwarroff, it was taken by storm. The English government interfered in 1790, to oblige Russia to restore it to Turkey; but the Porte ceded the place, which was quite devastated, at the peace of 1791. Oczakow has never recovered, and has not at present above 1000 inhabitants, consisting of Greeks, Armenians, Turks, Russians, and Moldavians. This however may be ascribed in a great measure to the rise of Odessa, which attracted both its trade and its population. The town is still of some importance, because the larger merchantmen going to Kherson are obliged by the shallowness of the sea to stop at Oczakow, where the goods are put on board smaller vessels. Not far from Oczakow, at the village of Tarutino, at the mouth of the Bug, are the ruins of the ancient Milesian colony of Olbia, where numerous antiquities, particularly antient coins, are frequently found.

**ODE** is derived from a Greek word, which signifies a song (*ὕμνος, ᾠδή*), and appears to have been originally applied to any kind of poetry which was written to be sung or accompanied with music. The ode may be regarded as the foundation of lyric poetry, and differs from epic poetry in delineating the poet's own thoughts and feelings, while the latter species of poetry details external circumstances and events. The most celebrated Greek and Roman odes are those of Pindar, Horace, and Anacreon. In English the best odes have perhaps been written by Dryden and Gray. For a further account of this species of poetry the reader is referred to **LYRIC POETRY**.

**ODENATUS**, or **ODENATHUS**. [**ZENOBIA**.]

**ODENSEE**. [**FÜNEN**.]

**ODENWALD**. [**GERMANY**.]

**ODER**, River. [**GERMANY**.]

**ODERIT** is probably black mica; for, like that substance, it may be split into thin leaves. It is opaque, black, and has very little lustre. Its colour is probably owing to some foreign substance, which may cause the difference between its appearance and that of common mica. It occurs in Sweden.

**ODESSA**, a seaport and important commercial town of Southern Russia, in the government of Kherson, is in 46° 28' N. lat. and in 30° 42' E. long., at the north-western extremity of the bay of Adschai. This town, which is now so flourishing, and constantly increasing in extent and importance, was a miserable village called Kodschabeg when the empress Catherine obtained possession of Oczakow and the part of the country as far as the Dniéper, by the treaty of peace of 1791. Ever since the time of Peter I. the Russians had been very desirous of an establishment on the Black Sea, especially after they had got possession of the south-east part of Poland. Catherine chose this spot for the site of the new town and seaport, and several regiments were employed in 1794 in digging the foundation and in the construction of public works. The site is on the whole well chosen. There is no river, but it has a fine bay, with sufficient depth of water, almost to the very shore, for the largest men-of-war. The bottom is fine sand or gravel, and the bay is seldom frozen, and then only for a short time.

The emperor Alexander completed what Catherine had begun. He appointed the Duke of Richelieu, a French emigrant nobleman, who had entered the Russian service, to the post of governor of the new town, under whose judicious administration its prosperity rapidly increased. The first inhabitants of Odessa were some Greek families, but in 1804 the population already amounted to 15,000. The town is regularly built in the form of an oblong parallelogram, on a declivity sloping towards the sea. The surrounding

country is an extensive and fertile plain, but the climate is unhealthy at some seasons of the year. The harbour, which is formed by two large moles, and can contain two hundred ships, is defended by strong works. At the eastern extremity is the citadel, and at the other the lazaretto; on a projecting point of land on the south side of the bay there is a lighthouse. The road is very spacious, and the anchorage safe, being protected against all winds except the south-east. The town is well built; the streets are broad and straight, but not paved. The houses are in general two stories high, and built of stone. There are many fine buildings; among them the church of St. Nicholas, which is the Russian cathedral, the Protestant church, the admiralty, the hospital, the custom-house, the exchange, and the theatre, where Russian pieces, Italian operas, and Greek tragedies are performed. There is a fine public garden in the middle of the town. Between the harbour and the town there is a line of barracks, consisting of sixteen detached edifices; there are in the town nearly six hundred corn-magazines, and a bazar, which contains 550 shops.

To the north of the town there are magazines of salt and salt meat, and to the west of them reservoirs of water. The rivers which flow into the sea on both sides being at a considerable distance, Odessa used often to suffer from want of water, but this disadvantage has been remedied by the construction of an aqueduct. The chief establishment for education is the Lyceum, founded by the Duke de Richelieu, on the plan of those in France, and called by his name; two schools for jurisprudence, political economy and commerce, and a school for training schoolmasters, are connected with the Lyceum: the other institutions are a school for young ladies, a school of trade and navigation, a model-school for young Jews, the academy of the Oriental languages, the museum of the antiquities of Southern Russia, and the botanic garden and the Agricultural Society. Three public baths have been established of late years, chiefly for the Poles, many of whom come to Odessa for the benefit of sea-bathing. The total population of Odessa, with its suburbs of Perisip and Moldawanka, was 63,000 at the end of 1837, among whom there are many Jews, Poles, Greeks, Armenians, and German mechanics. The labouring class consists chiefly of Little Russians, who speak a Russian dialect, and are for the most part runaway serfs. The adjacent country is inhabited by settlers from different parts of Germany, by Bulgarians, gypsies, Polish and Russian peasants. Of the Russian inhabitants of the adjacent country, the men are a robust well-built race; the women, on the contrary, are very ugly, dirty, and lazy. The Jews are in general very dirty in their dress; the costume of the Jewesses, many of whom are very handsome, is more ornamental, and often rich. The Greeks appear in a motley mixture of Turkish or Slavonian costumes. The Greek women are very handsome, and their dress pleasing and tasteful.

In the year 1817 Odessa was declared a free port for thirty years, into which all foreign goods are admitted free of duty. The space allotted to the free port is enclosed with a circular wall to prevent smuggling into the interior. The most important article of exportation is corn from the Ukraine. Wheat is exported to Turkey, Italy, France, Spain, and England. The principal towns with which Odessa is directly connected are Trieste, Leghorn, Marseille, Barcelona, and London. Other articles brought from the Ukraine for exportation are flax, timber, tallow, and hides. The imports are colonial produce, and manufactures of all kinds. The richest merchants are English, French, and Italians; many Jews and Armenians are also engaged in trade.

Odessa has considerable breweries and distilleries, and manufactories of woollens and silks, tobacco, soap, and candles. There is a great want of mechanics in the town, and of agricultural labourers in the country. The Russian government has granted great advantages to settlers of both kinds. Within these few years many gardens have been formed in the environs.

The commerce of Odessa in 1838 was remarkably prosperous: the value of the exports exceeded 38 millions of rubles, and that of the imports was nearly 22 millions of rubles. Above 800 foreign ships (of which 160 were English) entered the port, and nearly 800 sailed laden with the productions of Southern Russia, amongst which was above a million chetverts\* of wheat. Of vessels employed in "

\* A chetwert is 288 lbs. English.

coasting-trade, 659 arrived and 702 sailed. The customs' duties were, 1, for the Richelieu Lyceum, 3,274,686 rubles (there is a small duty on every chetwert of corn); 2, for the town of Odessa, 1,630,612; 3, for the lighthouses, 19,975: in all, 4,925,273 rubles. The year 1839 will probably show a further increase in the trade of Odessa; for the value of the exports in the first six months of the year was 23,109,990 rubles, whereas it was only 13,855,324 in the first six months of 1838. Up to August the imports were 12,662,162 rubles; 492 ships had arrived, and 473 sailed.\*

(Hassel; Stein; Cannabich; and the *Russian Official Journal of the Chamber of Merchants*.)

ODIN, or OTHIN, was the principal deity of the antient Scandinavians and Northern Germans. 'Wodan,' or 'Gwodan,' was another form of the name of Odin. Odin is represented by some as the god of war, the Mars of Scandinavian mythology. (Paulus Diaconus; Adamus Bremensis; Braun, *Religion der alten Teutschen*.) Among the Anglo-Saxons, Wodan was the god of merchants, corresponding to the Hermes of the Greeks. The fourth day of the week, Wednesday, derived its name from this deity. In the account of the origin of the world, as given in the older Edda, Odin, the eldest son of Bór, the second man, is represented as having, with his two brothers Vile and Vé, defeated and slain the frost giant Ymer, out of whose body they formed the habitable world. According to this fable, Odin and his brethren and antagonists are personifications of the elements of the world. [MYTHOLOGY, *Physical Theory*.] But there is another and a younger Odin, who is partly a mythological and partly an historical personage.

In all the Scandinavian traditions preserved by the chroniclers, mention is made of a chief, called Odin, who came from Asia with a large host of people called Aser, and conquered Scandinavia, where he built a city called Sigatuna, with temples, and established a worship and a hierarchy; he also invented or brought with him the characters of the Runic alphabet; he was in short the legislator and civiliser of the North. He is represented also as a great magician, and was worshipped as a god after his death, when some of the attributes of the older Odin were ascribed to him. (Messenius, *Scandia Illustrata*; Münter, *Ecclesiastical History of Denmark*; Finn Magnussen, *Priscæ veterum Borealiæ Mythologiæ Lexicon*, Copenhagen, 1828.)

The epoch of this emigration of Odin and his host is a subject of great uncertainty. Some place it in the time of the Scythian expedition of Darius Hystaspis; others (and this has been the most common opinion among Scandinavian archæologists) fix it about the time of the Roman conquests in Pontus, about 60 B.C. Suhm, in his 'Geschichte der Nordischen Fabelzeit,' enumerates four Odins. One was Bór's son; he came from the mouths of the Tanais, and introduced into the North the worship of the sun. A second, the son of Hermodi, came with the Aser from the borders of Europe and Asia at the time of the invasion of Darius Hystaspis, and brought with him the Runic alphabet, built temples, and established the mythology of the Edda: he is called Mid Othin, or Mittel Othin. A third Odin, according to Suhm, was the son of Fridlef; he fled from the borders of the Caucasus at the time of Pompey's conquests, 50 or 60 years B.C., settled at Upsala, and distributed Norway, Denmark, Gothland, and Scania among his several sons. The fourth Odin, called also the Saxon Odin, lived in the third or fourth century of our æra, and is alluded to by Saxo Grammaticus and other chroniclers. All this however is far from being authenticated, though the north-western emigration of Odin from the borders of the Caucasus to Scandinavia has the support of a uniform tradition in its favour. For the antient mythology of Scandinavia see EDDA.

Wodan, or Odin, was worshipped by the Saxons, the Alemanni, the Longobards, and other German nations, until their conversion to Christianity.

ODO, Bishop of Baieux. [BAIEUX TAPESTRY.]

ODO'ACER, a Gothic chief, who, according to some authorities, was of the tribe of the Heruli, originally

served as a mercenary in the barbarian auxiliary force which the later emperors of the West had taken into the pay for the defence of Italy. After the two rival emperors Glycerius and Julius Nepos were both driven from the throne, Orestes, a soldier from Pannonia, clothed his own son Romulus, yet a minor, with the imperial purple, but retained all the substantial authority in his own hands. The barbarian troops now asked for one-third of the lands of Italy to be distributed among them as a reward for their services. Orestes having rejected their demand, they chose Odoacer for their leader, who immediately marched against Orestes, who had shut himself up in Pavia. Odoacer took the city by storm, and gave it up to be plundered by his soldiers. Orestes was taken prisoner and led to Piacenza, where he was publicly executed, in August, A.D. 476, exactly a twelvemonth after he had driven Nepos out of Italy. [NEPOS.] Romulus, who was called Augustulus by way of derision, was in Ravenna, where he was seized by Odoacer, who stripped him of his imperial ornaments and banished him to a castle of Campania, but allowed him an honourable maintenance. Odoacer now proclaimed himself king of Italy, rejecting the imperial titles of Caesar and Augustus. For this reason the Western empire is considered as having ended with the deposition of Romulus Augustulus, the son of Orestes. Odoacer's authority did not extend beyond the boundaries of Italy. Little is known of the events of his reign until the invasion of Theodoric, king of the Ostrogoths, who, at the instigation, as some historians assert, of Zeno, emperor of the East, marched from the banks of the Danube to dispossess Odoacer of his kingdom. Theodoric, at the head of a large army, defeated Odoacer near Aquileia, and entered Verona without opposition. Odoacer shut himself up in Ravenna, A.D. 489. The war however lasted several years; Odoacer made a brave resistance, but was compelled by famine to surrender Ravenna (March, 493). Theodoric at first spared his life, but in a short time caused him to be killed, and proclaimed himself king of Italy. (Procopius; Cassiodorus.)

ODONTIS. [MONODONTA.]

ODONTO'PHORUS. [TETRAONIDÆ.]

ODOSTO'MIA, Fleming's name for a genus established from several small species of land shells—*Turbo plicatus, spiralis, unidentatus*, &c. of Montagu. The following is the Generic Character.—Shell conical; aperture ovate; peristome incomplete retrally, and furnished with a tooth on the pillar.

ODYSSEY. [HOMER.]

ECOLAMPA'DIUS. [ZWINGLI.]

ECUMENICAL COUNCILS. During the first and the greater part of the second century after the Christian æra, the Christian communities called churches were independent of each other. In process of time assemblies were held for the purpose of collecting the opinions of the churches on any points of faith or practice respecting which disputes had arisen. These assemblies were at first provincial, and consisted of the bishops only, or of the bishops and some of the inferior clergy, as representatives of the churches. They had their origin among the Greeks, by whom they were named *Synods* (συνόδοι, that is, *Meetings*), and were adopted by the Latins, who called them *Councils* (Concilii); their decrees were called *Canons* (κανόνες, that is, *Rules*). We have no trace of them till towards the end of the second century.

Constantine the Great was the first who attempted to assemble a council consisting of representatives from the whole Christian church. Such councils were called *Œcumenical* (οἰκουμένηαι, that is, *general* or *universal*) from their comprising the whole Roman empire, which, in common language, was considered as equivalent to the habitable world (Œcūmene, ἡ γῆ οἰκουμένη). The canons of such councils were considered to be binding on the whole church. The following list contains those which are considered as general councils by the Latin church. There never was an Œcumenical council in the strict sense of the word. Of those in the following list, the first seven alone have any pretensions to the title, as all the others were held after the schism between the Greek and Latin churches: the latter can be accounted Œcumenical only by those who consider the church of Rome to contain the whole Catholic church. At the first seven however the number of representatives from the Eastern church was very small.

1. *The First Council of Nice*, convened by Constantine

\* The following was received from St. Petersburg on the day when this article was sent to press:—

'Odessa, December 12, 1839. This will be a remarkable year in the annals of our commerce, on account of the great number of vessels from foreign countries which have entered the port. Up to this time they amount to 973, and a great many more are expected. The English far exceed in number those of any other nation; they already amount to 306; and out of 130 vessels now at anchor in the port, 60 are English. It is said that 50 more will arrive shortly, most of them being already in the Black Sea. The number of Greek and Neapolitan ships has likewise considerably increased this year.'



to settle the Arian controversy, A.D. 325. [NICE, COUNCIL OF.]

II. *The First Council of Constantinople*, convened by Theodosius the Great, to settle controversies respecting the Trinity. It added to the Nicene creed the words which relate to the divinity of the Holy Ghost, A.D. 381.

III. *Council of Ephesus*. It condemned the Nestorian heresy, A.D. 431. [NESTORIANS.]

IV. *Council of Chalcedon*, against Eutyches, A.D. 451. [CHALCEDON; EUTYCHIANS.]

V. *The Second Council of Constantinople*, convened by Justinian I., on the resurrection of the body and the pre-existence of the soul. It condemned the Origenists and the 'Three Chapters,' A.D. 553.

VI. *The Third Council of Constantinople*, under Constantine Pogonatus. It condemned the Monothelites, A.D. 680. [EUTYCHIANS.]

VII. *The Second Council of Nice*. It approved the worship of images, A.D. 787.

VIII. *The Fourth Council of Constantinople*. It condemned Photius, A.D. 869.

IX. *The First Lateran Council*, convened by Pope Calixtus II. It decided in favour of the church's sole right of investiture to ecclesiastical offices, and decreed the celibacy of the clergy, A.D. 1123.

X. *The Second Lateran Council*, under Pope Innocent II., against the heretics Pierre de Bruis and Arnold of Brescia, and for the reformation of the church, A.D. 1139.

XI. *The Third Lateran Council*, under Pope Alexander III. It condemned the Waldenses and Albigenses, and settled the mode of electing the popes, A.D. 1179.

XII. *The Fourth Lateran Council*, under Pope Innocent III. It condemned the Albigenses, and defined the doctrine of transubstantiation, A.D. 1215.

XIII. *The First Council of Lyon*, under Innocent IV., for promoting the Crusades, restoring ecclesiastical discipline, and dethroning the emperor Frederick II., A.D. 1245.

XIV. *The Second Council of Lyon*, under Gregory X., for the re-union of the Greek and Latin churches, A.D. 1274.

XV. *Council of Vienne*, under Clement V., convened to suppress the Templars, to condemn heretics, and to assist the Christians in Palestine, A.D. 1311.

XVI. *Council of Constance*, convened by the emperor Sigismund, to settle the papal schism. It condemned John Huss and Jerome of Prague to the flames. It sat from 1414 to 1418 A.D. [CONSTANCE, COUNCIL OF.]

XVII. *Council of Basel*. Sat from 1431 till 1448 A.D.

XVIII. *Fifth Lateran Council*, convened by Pope Julius II., to oppose another which had been held the year before at Pisa by nine cardinals, A.D. 1512.

XIX. *The Council of Trent*, convened by Paul III., in order to crush the Reformation. It sat from 1545 to 1563 A.D. [TRENT, COUNCIL OF.]

CECUMENIUS was bishop of Tricca in Thessaly. The time at which he lived is uncertain: but it was after the eighth century and before the tenth. He is generally placed in the ninth century; Cave assigns to him the date A.D. 990., Lardner, A.D. 950. He wrote commentaries on the *Acts*, on St. Paul's fourteen Epistles, and on the seven Catholic epistles (and perhaps on the *Revelation*), in the form which is called a *Catena* (chain), that is, containing, besides his own observations, the remarks of other writers. Among the authors thus quoted by him are Chrysostom, Cyril of Alexandria, Gregory of Nazianzus, Isidore of Pelusium, Theodoret, and Photius. The best editions of his works are those of Verona, 1532, and Paris, 1631.

(Monfaucon, *Bibliotheca Coisliniana*, pref. and p. 274; Fabricius, *Bib. Græc.*, tom. vii., p. 788; xiii., p. 845; Cave, *Hist. Lit.*, tom. ii., p. 112; Lardner's *Credibility*, in Works, vol. v., p. 154, ed. of 1831.)

OEDENBURG (in Hungarian, *Soprony*; the *Soprenium* of the Romans), the capital of the palatinate of the same name, is situated in a pleasant and fruitful country, amidst extensive vineyards and woods of chestnut-trees. It is about two miles and a half from the south-western part of the lake called the Neusiedler See. The temperature on the banks of this lake is milder than about Oedenburg itself, and the best vineyards are now there. The inhabitants have been celebrated from remote ages for the culture of the vine and the excellence of their wines, but of late years this

branch of industry has from some unexplained causes greatly declined, and the wine is very inferior to what it once was.

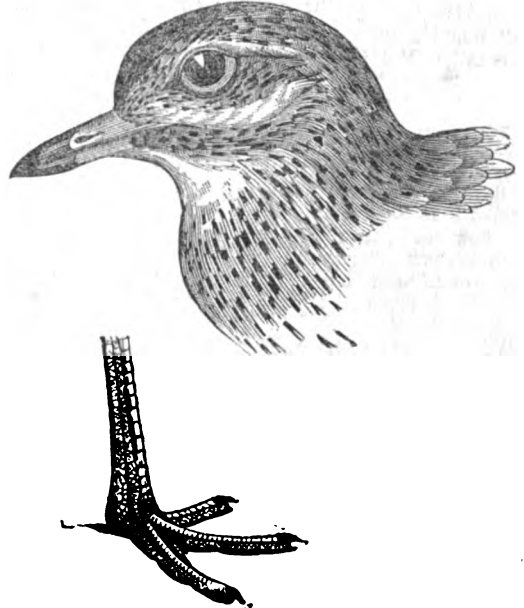
The town itself is not large, but it is regular and well paved; the suburbs are extensive and well built. The inhabitants, 14,000 in number, are Germans, whose ancestors came from Austria and Styria. Among the public institutions are the Roman Catholic chapters, a gymnasium (with 300 scholars) and a school, a Lutheran superintendency with a lyceum (360 pupils), and a Protestant German school (300 scholars). There are also a convent of Dominican monks, one of Ursuline nuns, two Roman Catholic churches, and a Protestant church. The inhabitants manufacture considerable quantities of woollen cloths, playing cards, snuff and tobacco, and sugar. They carry on a great trade in the productions of the country, and have well-frequented cattle-fairs, at which not less than 40,000 head of horned cattle and 150,000 swine are annually sold. In the vicinity there are very extensive coal-mines.

Oedenburg was founded by the Romans, and was the station of the fifteenth legion. Many Roman antiquities, inscriptions, coins, lamps, sarcophagi, &c., have been found in the neighbourhood.

ŒDICNEMUS (literally, 'thick or swollen leg'; from *οἰδ-ανω*, to swell, and *νήμη*, a leg), Belon's name for an interesting genus among the birds, which seems to be the connecting link between the two great groups of Bustards and Plovers.

Mr. Vigors terminates the family *Charadriadæ* by this form, which, in his opinion, by its affinity with the earlier groups of the *Gruidæ*, connects the former family with that which commences his order *Grallatores*. 'We may also remember,' adds Mr. Vigors, 'that the family of *Struthionidæ*, among the Rasores, is closely allied to the *Gruidæ* of the order before us (*Grallatores*), and equally so to the *Charadriadæ*, in consequence of the absence of the hinder toe. With the latter indeed it is frequently united into one group, from their similarity in this character, and the cursorial habits resulting from it, which are common to both. These three naturally allied families therefore are thus brought into contact, and their mutual affinities preserved; while at the same time they retain in the system the various stations into which the difference in their more important characters tends to separate them.

Mr. Swainson agrees in the main with Mr. Vigors. Linnæus had previously placed the form among the Plovers, and Cuvier had made his family *Pressirostres* consist of the Bustards (*Otis*); the Plovers (*Charadrius*)—which he distributes into two subdivisions, *Œdicnemus*, Temminck; and the Plovers properly so called, *Charadrius*—*Vanellus*, Bechst., consisting of the *Vanneaux Pluviers* (*Squatarola*, Cuv.) and the True Plovers (*Vanellus*, Cuv.); *Hæmatopus*, *Cursorius*, and *Microductylus*, the *Cariama* of Brisson (*Diccholophus*), which last leads to the family of *Culirostres*, composed of the great genus *Ardea* of Linnæus.



Head and foot of Œdicnemus.

M. Temminck, who appears to be the first among the moderns who applied the term *Edicnemus* to the genus, places it at the head of his *Grallatores*; and M. Lesson, in his 'Manuel,' places it among the *Charadriadæ* (Leach), between *Burhinus*, Ill., and *Himantopus*, Briss.

Mr. Gould, who considers the genus as connecting the Bustards and Plovers, observes that he has often had occasion to remark, that while the normal or typical groups are abundant in species, the aberrant forms, which appear to be created for the purpose of filling up the intervening chasms, are restricted for the most part to a limited number of species: thus while the Bustards and Plovers comprise a vast multitude of species, the genus *Edicnemus* contains at most but five or six, and these confined entirely to the regions of the Old World. (*Birds of Europe*.)

**Generic Character.**—Bill strong, nearly straight, rather depressed towards the tip, culmen elevated, lower mandible angulated; *nostrils* longitudinal, pierced through and through the horny part of the middle of the bill, and most open anteriorly. *Tarsi* long. Three *toes*, all before, united as far as the second joint by a membrane which skirts their edges. *Wings* moderate; first *quill* shorter than the second, which is longest.

Example, *Edicnemus crepitans*, Temm. — *Charadrius Edicnemus*, Linn.

**Description.**—All the upper parts of a reddish ashy-brown, with a longitudinal dash on the middle of each feather; space between the eye and the bill, throat, belly, and thighs, pure white; neck and breast slightly coloured with reddish and speckled with longitudinal brown streaks; a longitudinal white band on the wing; towards the middle of the first quill a great white dash, and a very small one on the interior barb of the second; lower tail-coverts ruddy; quill-feathers, except those of the middle, terminated with black; base of the bill bright-yellowish, the rest black; naked skin round the eyes, iris, and feet, pure yellow. Length from the bill to the feet 16 inches 2 lines. *Male* and *Female*.

Such is Temminck's description of the adult bird; but the plumage varies in some individuals. For instance, in the specimen figured and described by Gould, in his 'Birds of Europe,' there is an obscure bar of white above and below the eye, and the ground-colour of the flanks and under surface is stated to be yellowish-white; whilst the yellow toes and feet are noticed as having a tinge of green.

**Young Birds.**—These have the colours less distinct, and are detected at the first glance by the highly dilated form of the upper part of the tarsus and by the size of the knee-joint. Temminck, who gives this description, adds that this form of the tarsus exists in the *young of the year* of all species of birds with long slender legs, but is particularly remarkable in the young *Edicnemus*.

This is the *Ostardeau* of Belon; *Le Grand Pluvier*, ou *Courlis de Terre* of the French; *Gran Pivieri*, *Curloite*, *Curlui*, and *Curluovi* of the Italians; *Lerchengraue Regenpfeifer*, *Grosser Brachvogel*, and *Grosse Brachvogel* oder *Gluth* of the Germans, among whom it is also called *Triel*, or *Griel*, according to Gesner, who thinks that it is the *Charadrius* of Aristotle; *y Glin-braff* of the ancient British; *Thick-knee*, *Thick-kneed Bustard*, *Stone Curlew*, and *Norfolk Plover* of the modern British.

**Habits, Food, Reproduction, &c.**—Rapid on foot, powerful in flight, which it executes in wide circles, and haunting downs and open places, this species is in general approached with difficulty by the sportsman, though it will often squat in places favourable to its colour, till it is almost trod on. Their shrill evening cry pierces the ear, and may be heard nearly a mile in a still night. Slugs, worms, reptiles, and, some say, mice, are eaten by them; but the two former seem to be their favourite food. White, in a letter to Pennant, dated 30th March, 1768, says, 'I wonder that the Stone Curlew, *Charadrius Edicnemus*, should be mentioned by writers as a rare kind: it abounds in all the campaign parts of Hampshire and Sussex, and breeds, I think, all the summer, having young ones, I know, very late in the autumn. Already they begin clamouring in the evening. They cannot, I think, with any propriety, be called, as they are by Mr. Ray, "circa aquas versantes;" for with us, by day at least, they haunt only the most dry, open, upland fields, and sheep-walks, far removed from water: what they may do in the night I cannot say. Worms are their usual food, but they also eat toads and

frogs.' No nest receives the eggs, which are two or three in number, of a light brown or dirty white, with dusky blood-coloured blotches and streaks. 'It lays,' says the author of the charming history of Selborne, 'its eggs, usually two, never more than three, on the bare ground, without any nest, in the field; so that the countryman, in stirring his fallows, often destroys them. The young run immediately from the egg, like partridges, &c., and are withdrawn to some flinty field by the dam, where they skulk among the stones, which are their best security; for their feathers are so exactly of the colour of our grey-spotted flints, that the most exact observer, unless he catches the eye of the young bird, may be eluded. . . . *Edicnemus* is a most apt and expressive name for them, since their legs seem swollen like those of a gouty man. After harvest I have shot them before the pointers in turnip-fields.' In his MS. the same author remarks that they seem to descend in the night to streams and meadows, perhaps for water, which their upland haunts do not afford them.

**Geographical Distribution.**—Europe generally, where it seems to be migratory in many parts, in Britain and Germany for instance. Temminck notes it as abundant in the south of France (in which country Belon found young ones that could not fly at the end of October), Italy, Sardinia, the Greek Archipelago, and Turkey. It is also found in Asia and Africa. It occurred among the Trebizond collection of birds presented to the Zoological Society of London by Mr. Keith Abbott; and the localities attributed to it by Mr. Gould are Europe and Africa, but not India. (*Zool. Proc.*, 1834.) Col. Sykes however had previously recorded it among the birds of the Deccan: at least he says 'there is no visible difference between the Dukhun and British species.' (*Zool. Proc.*, 1832.) If it be the *Charadrius* Kervari of Hasselquist, which Linnæus and most authors suppose it to be, that traveller describes it as inhabiting Lower Egypt, near the sepulchres, and in the deserts. In Britain it arrives early in the spring. The following is the earliest period recorded by White:—'On the 27th of February, 1788, Stone Curlews were heard to pipe; and on March 1st, after it was dark, some were passing over the village, as might be perceived by their quick short note, which they use in their nocturnal excursions by way of watch-word, that they may not stray and lose their companions. Thus we see that retire whithersoever they may in the winter, they return again early in the spring, and are, as it now appears, the first summer birds that come back. Perhaps the mildness of the season may have quickened the emigration of the curlews this year.' They are seldom seen after the beginning of October; but Markwick states that he received on the 31st January, 1792, a bird of this species which had been recently killed by a neighbouring farmer, who said that he had frequently seen it in his fields (Sussex) during the former part of the winter. This, perhaps, adds Markwick, was an occasional straggler, which, by some accident, was prevented from accompanying its companions in their migration. As the autumn advances, these birds collect into flocks, soon after



*Edicnemus crepitans*.

which they leave this country. Norfolk, Suffolk, Kent, and Hampshire seem to be the favourite counties of the Stone Curlew; but it occurs, though rarely, in the Yorkshire Wolds, higher than which it does not seem to go in these islands. Mr. Selby says that he never met with it or heard of it in the more northern English counties, nor in Scotland. It does not occur in Mr. Thompson's Irish list in the 'Zoological Proceedings.'

*Utility to Man.*—In the hands of a good cook this species is a delicate bird for the table.

In the *Portraits d'Oyseaux*, the following quatrain well describes the bird and the reason for the name given to it by Belon:—

'L'on peut nommer cestuy-cy, Ostardeau,  
Parcequ'il est approchant de l'Ostarde,  
Qui sous le ploy des genoux l'os regarde,  
Le trouve gros plus qu'à nul autre oiseau.'

# OELAND. [ALAND.]

OELS is a lordship, with the title of a principality, in Lower Silesia, and in the Prussian government of Breslau. Together with the principality of Oels Bernstadt, which has been united with it ever since 1745, it has an area of 780 square miles, above 90,000 inhabitants, and a revenue of 18,000*l.* per annum, burdened however with debts of long standing. The soil is in general fertile, and produces much corn, flax, fruit, and also timber, the forests being very extensive. Game and fish are in abundance. The chief town, OELS, situated in 51° 25' N. lat. and 22° 30' E. long., in a plain on the river Oelsa, has a population of 6100 inhabitants, who carry on considerable manufactures of woollen cloths; there are likewise extensive breweries. The palace or castle, in which there is a good library, with collections of works of art and natural history, is surrounded with walls and a moat, and has a beautiful park. There are in the town one Roman Catholic and 5 Lutheran churches, 3 hospitals, a Lutheran gymnasium, admirable establishments for the poor, an institution founded in 1821 for the promotion of morality among poor country girls, a theatre, &c. The principality of Oels, after the death of the last duke, Charles Frederic of Münsterberg and Oels, in 1647, came to his son-in-law Duke Silvius Nimrod of Würtemberg, founder of the line of Würtemberg-Oels. This line becoming extinct in 1792, the principality came, through his only daughter and heiress Sophia Frederica Charlotte, to her husband Duke Frederick Augustus of Würtemberg; and after his death, in 1805, to his nephew Duke Frederick William of Brunswick, who fell in the battle of Quatre Bras in 1815, the succession having been secured to him by Frederick the Great in 1785. After his death it devolved to his eldest son and successor Charles, who in 1825 made it over to his brother William, who still possesses it, since he assumed the government of Brunswick in 1830.

**CENANTHE**, a poisonous genus of apiaceous or umbelliferous plants, one of which, the *C. pimpinelloides*, appears to have been the *οἰάνθη* of Theophrastus and Dioscorides. The species are readily known, independently of other characters, by their fruits being, by the contraction of the rigid pedicels, strongly compacted into heads, the upper side of which is muricated by the stiff straight long styles. The fruits have on each face five convex obtuse ridges, of which the marginal ones are a little the largest.

The species are all inhabitants of damp meadows or watery places, and are common in Europe. The most important is *C. crocata*, an inhabitant of ditches, banks of rivers, and similar situations. This plant, which Dr. Christison reckons the most energetic of the narcotico-acrid poisonous plants of its class, has a root of many fleshy fingers, looking exactly like a dahlia-root in miniature, but abounding in an orange-coloured fetid juice, which is also plentiful in other parts of the plant, and in which the deleterious qualities reside. The stem grows from two to five feet high, is much branched, round, and hollow. The leaves are of a dark shining green, doubly pinnate, with wedge-shaped leaflets variously and deeply cut. The umbels are large and convex, of many general and a still greater number of partial rays. The bracts of the involucre are variable in number and size. The flowers are white, tinged with purple. Cases of accidental poisoning with this plant, in consequence of its roots having been mistaken for ground-nuts, parsnips, &c., by ignorant people, are common. In general death takes place within three hours and a half of the poison having been administered, and often within the first hour.



*Cenanthe crocata.*

# **CENANTHE. [WHEATEAR.]**

OESEL, an island in the Baltic, situated between 58° and 58° 40' N. lat. and between 21° 40' and 23° 20' E. long., stretches across the entrance of the Gulf of Livonia, or Bay of Riga. It extends from south by west to north by east about 45 miles, with an average width of about 25 miles; a narrow peninsula extends from its south-western corner about 20 miles southwards. The area of the island falls short of 1200 square miles: in extent it may be compared with the county of Stafford. The surface is uneven and rocky, but it is covered with a good layer of vegetable mould, and accordingly the island is rather fertile. The highest hills do not appear to exceed 200 feet in elevation. The winters are much less severe than on the adjacent continent. The island produces grain, of which a part is exported, flax, hemp, and a little tobacco. A considerable portion of the island is used as pasture-grounds. The inhabitants, who are Esthonians, amount to more than 30,000. The island belongs to the government of Livonia, or Riga, of which it constitutes the circle of Arensburg, so called from the principal town, which is situated on the southern coast of the island, has a harbour for small vessels, and carries on some trade with Riga in the produce of the island. The population is about 1500. Oesel was early taken possession of by the Danes, who ceded it to Sweden, in 1645, by the peace of Bromsebrö; it remained in the possession of the Swedes till the beginning of the last century, when it was taken by Russia, to which power it was finally ceded, in 1721, by the peace of Nystädt, together with Livonia. The position of this island across the entrance of the Gulf of Livonia renders the navigation of that gulf dangerous in the early part of the spring. When western or north-western winds prevail, the ice which is brought down by the Düna river, being prevented from dispersing in the sea, is accumulated within the gulf, a circumstance which causes loss of life and property.

**ŒSOPHAGUS**, or gullet, is the canal leading from the pharynx, the short cavity at the back of the mouth, to the stomach. In man, it is composed of two layers of muscular fibres, an external longitudinal layer, and an internal, composed of circular fibres, by which the food is pro-



pelled towards the stomach, and which are lined by a layer of soft mucous membrane and a moderately thick cuticle continued from that of the lips and mouth. In many animals its interior is beset with numerous firm pointed processes directed towards the stomach to prevent any food that has passed through it from returning into the mouth; in the ruminants, on the other hand, it is one of the chief means by which the partially digested food is brought again to the mouth for the chewing of the cud.

**ÆSTRIDÆ**, a family of Dipterous insects of the section *Athericera*, distinguished by the proboscis being either in a rudimentary state or wanting; the palpi are sometimes distinct and occasionally wanting; the antennæ are short, enclosed in a cavity in the fore part of the head; the third joint is usually globular, and the stylet is usually dorsal; the abdomen is generally large; the wings have generally three posterior cells, of which the first is often closed.

It will be seen from the above definition that the *Æstri* of the moderns cannot be the same as the *Æstrus* (*οἰστρος*) of the ancient Greeks, a fly, which, we learn from Aristotle (*Hist. Anim.*, iv. 4, &c.), Virgil (*Georgics*, iii. 148), Ælian, and others, is armed with a strong tongue (proboscis), pierces the hides and sucks the blood of quadrupeds, and makes a peculiar kind of harsh humming noise. Mr. Bracy Clark states that the *Æstrus bovis* makes no noise whilst flying, and Mr. W. S. M'Leay says, 'the *Æstrus equi* is also silent in flying, as I have repeatedly myself observed.' The absence in some and the rudimentary state of the proboscis in others of the modern *Æstri* proves that they are not blood-suckers; and this fact is otherwise at variance with the description given by the ancients, their *Æstri* having a strong proboscis, a circumstance which, connected with the blood-sucking habits of the *Tabanidæ*, another family of Dipterous insects, induces Mr. M'Leay to imagine that the *Æstrus* of the ancients belongs to that group. An ingenious paper on this subject, by the gentleman last mentioned, will be found in the 14th volume of the 'Linnæan Transactions.'

The modern *Æstridæ* are certain flies (whose larvæ are well known by the name of bots) which deposit their eggs on the body of various herbivorous quadrupeds, so that the larva when hatched shall find itself in the neighbourhood of its appropriate food, either in the hide of the animal, in its stomach, or elsewhere. Each species of *Æstrus*, almost invariably confines its attacks to a certain species of quadruped, and finds its nutriment in the same part or nearly the same part of that quadruped; from this circumstance the species are often named after the animal of which each is a parasite.

The larvæ of the *Æstri* are usually of a conical form, and the segments of the body are generally furnished with spines; the organs of respiration are situated at the posterior extremity of the body, which is the largest; the mouth, which is situated at the opposite extremity, in some consists of soft mamillæ, whilst in those species which derive their nutriment in the stomach of an animal or in such a situation that they would be liable to be dislodged, the mouth is furnished with two hooks for prehension; these hooks are curved outwards, so that when once inserted they retain their hold without any exertion on the part of the insect.

These larvæ are divided by Latreille, according to the situations which they inhabit, into *cutaneous*, *cervical*, and *gastric*, as some live in the tumours formed on the skin, others in some part of the interior of the head of the animal attacked by them, and the last in the stomach. 'The eggs of the first,' says Latreille, 'are deposited by the parent under the skin, by means of a squamous ovipositor, composed of four tubes fitting one within the other, and armed at the end with hooks and two other appendages. This instrument is formed by the last annuli of the abdomen. These larvæ are not compelled to change their domicile, finding themselves, when hatched, in the midst of the purulent matter on which they feed. The ova of the others are simply deposited, and glued to various parts of the skin, either in the vicinity of the natural cavities into which the larvæ afterwards penetrate and take up their abode, or on those spots which the animal is in the habit of licking, by which means the larvæ are conveyed by the tongue into the mouth, whence they are carried with the food into the stomach, to the coats of which they attach themselves.' Mr. Bracy Clark thinks the food of these is most probably the chyle, which, being nearly pure aliment, may go wholly to

the composition of their bodies, without any excrementitious residue. When full grown, they pass with the digested food, and falling to the ground, they seek some convenient retreat, in which they assume the pupa state and undergo their final transformation. A detailed account of the habits of several of the species of *Æstri* will be found in the article Bots.

In the most modern work on dipterous insects\* the following seven genera are enumerated as belonging to the family *Æstridæ*.

Genus 1. *Cuterebra* (Clark). Distinguishing characters head somewhat swollen in front; buccal cavity triangular; proboscis very small and retractile; third joint of the antenna ovate; stylet plumose; joints of the tarsi provided with tolerably large pads. Two species of this genus are found in North America, the *Cuterebra cuniculi* and *C. buccata*; their larvæ are parasites on the hares and rabbits. A third species is found in Cayenne, the *C. ephippium*.

2. *Hypoderma* (Clark) has the proboscis indistinct; a small Y-shaped buccal opening; no distinct palpi; the third joint of the antenna is very short and transverse. To this genus belongs the *Æstrus* which attacks the ox (*Hypoderma bovis*), the larva of which lives in the hide of that animal.

3. *Edemagena*. This genus has the buccal opening linear, and enlarged above; it has no proboscis; the two palpi are placed near together and are two-jointed, the second joint is large, orbicular, and compressed; the claws and pads of the tarsi are large. Only one species of this genus is known, the *Edemagena tarandi*, and this is found in Lapland. The female fly deposits her eggs on the back of the rein-deer, and the larvæ live in the hide of that animal.

4. *Cephenemyia* has a very small rounded proboscis, above which the palpi are inserted close together; they are two-jointed, and the second joint is globular; the third joint of the antennæ is compressed, and the stylet is inserted at its base. The body is broad and rounded. *Cephenemyia trompe* is found in Lapland; its larva lives in the frontal sinus of the rein-deer. Since the same fly however is found in Saxony, where there are no rein-deer, the larva must find its nutriment likewise in some other animal.

5. *Cephalemyia*. In this genus the body is but sparingly clothed with hair, the head is very large and rounded in front; there are no cheek cavities; the palpi are wanting, or at least are only represented by two small tubercles; the stylet of the antenna is apical; the wings have two posterior cellules.

But one species of this genus is recorded, the *Cephalemyia ovis*. The female fly deposits her eggs in the nose of the sheep, and the larvæ live in the frontal sinus.

6. *Colax*. Here there are likewise no buccal cavities; the antennæ are distant from each other and inserted near the eyes, the stylet is terminal; the wings have four posterior cellules; the first posterior cellule is short and open, the third is closed, and the anal is long.

The only species hitherto discovered belonging to this genus is found in Brazil; its habits are unknown. It is the *Colax macula* of Wiedemann.

7. *Æstrus*. This generic name is now confined to such species of the *Æstridæ* as have no buccal cavity; the palpi wanting, or represented only by minute tubercles; the wings are decumbent, and have the first posterior cellule entirely open.

To this genus belongs the *Æstrus* whose larva or bot is found in the stomach of the horse, the *Æstrus equi*. The larvæ of two other species (*Æstrus hæmorrhoidalis* and *Æstrus salutaris*) are also found in the stomach of the horse.

The *Æstrus pecorum* (a species found in Sweden), when in the larva state, is found in the intestines of the ox.

The larva of another species, the *Æstrus nasalis*, is said to live in the œsophagus of the horse, the ass, the mule, the stag, and the goat.

**ÆTA, MOUNT.** [GREEK; THESSALY.]

**ÆTHRA**, Dr. Leach's name for a genus of Brachyurous Crustaceans, placed by M. Milne Edwards as the representative of his first division (*Canceriens Cryptopodes*) of his tribe *Cancerians*; and indeed his Cryptopod Cancerians are composed of this genus solely. Latreille made *Æthra* and

\* 'Histoire Naturelle des Insectes Diptères,' by M. Macquart, in two volumes, forming part of the 'Suites à Buffon.'

*Calappa* [CALAPPA] form the family *Cryptopoda*; but M. Milne Edwards is of opinion that the only character which they have in common with the latter is the existence of lamellar prolongations on the sides of the carapace, dispositions which are also found in certain *Leucosians*, whilst all the rest of their organization approaches that of the *Crabs*.

#### *Cethra*.

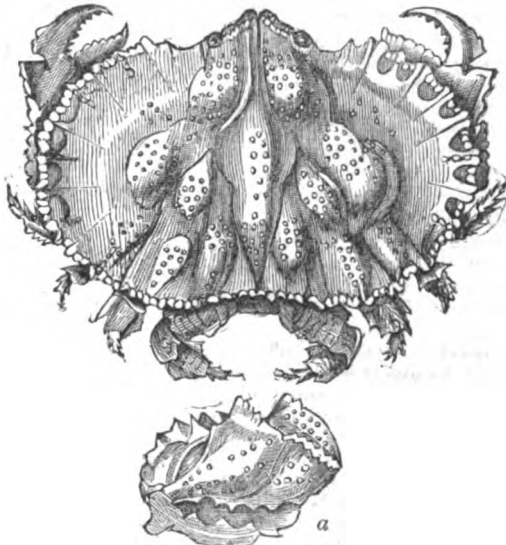
The whole surface of the body rugged and appearing as if eroded. *Carapace* a third wider than it is long, oval, strongly knobbed above, and with the lateral borders strongly denticulated and a little curved upwards. Front entire and a little more projecting in the middle than on the sides. *Eyes* very small, the orbits nearly circular, their upper border with two small fissures, and the lower border separated from the front by a very large gap. *Antennary fossels* nearly square, and the basilar joint of the *internal antennæ* filling them almost entirely; the moveable stem of these appendages very small, and bent longitudinally forwards. Basilar joint of the *external antennæ* very large, and advancing up to the lower border of the front, so as to fill the gap which would otherwise make the orbit communicate with the antennary fossel; its anterior extremity very narrow and upon the edge of the inferior orbital border; second joint of the *external antennæ* very small, occupying the internal *canthus* of the eyes, and supporting a stemlet which is rudimentary and very difficult to distinguish. *External jaw-feet* completely closing the buccal frame; the internal border of their second and third joints straight: this last portion is strongly truncated at its posterior and internal angle, and hides almost entirely the palpiform stemlet which has its origin under its anterior and internal angle. *Sternal plastron* much longer than it is wide. *Anterior feet* about once and a quarter as long as the post-frontal portion of the carapace, and of nearly the same form as in *Parthenope*, excepting that their upper and internal surface is slightly concave, so as exactly to fit the lower and anterior portion of the trunk; second pair of feet much shorter than the post-frontal portion of the carapace; the other pairs successively diminishing in length, and all surmounted with a sharp and unequal crest. *Tarsus* short and styliform. *Abdomen* with seven segments in the female and five only in the male.

*Place in the System*.—M. Milne Edwards is of opinion that this form has great affinity with the genus *Cryptopodia* belonging to the family of *Oxyrhynchs*, and that it establishes the passage between those crustaceans and the other *Cancerians*, at the same time that it approaches *Calappa*, whose natural place is in the family of *Oxytomes*.

*Geographical Distribution of the Genus*.—East Indian and African Seas.

Example, *Cethra scruposa*. Length 2 to 3 inches. Colour greyish.

*Locality*.—Isle of France and Indian Archipelago.



*Cethra scruposa*.

a, the right pincer, external view.

OETTINGEN, formerly an independent county in the

north part of Swabia, now belongs partly to Bavaria and partly to Würtemberg. Its area is 372 square miles, and the population above 61,000. It is a very fertile country, watered by the rivers Wernitz and Eger, and produces corn, hemp, flax, and timber. It has a good breed of horned cattle and horses, and is particularly famous for its geese. It abounds in fact in all the necessities of life except salt. It has likewise iron, saltpetre, and remarkably fine stone for building. The county is now divided between two princes, whose common ancestor, Lewis XV., lived at the time of the Reformation; of his two sons, Lewis XVI. founded the Protestant and Ferdinand the Roman Catholic branch: the former, which obtained in 1674 the rank of prince of the empire, became extinct in 1731; the latter was divided by the three sons of William the Elder into three branches—Oettingen-Spielberg, which obtained the princely dignity in 1734; Oettingen-Wallerstein, which succeeded by will to the possessions of the extinct Protestant line, and obtained the princely dignity in 1774; and Oettingen-Baldern, which is now likewise extinct.

Oettingen-Oettingen, or Spielberg, in the circle of the Rezat in Bavaria, is 84 square miles in extent, and contains about 15,000 inhabitants. The prince resides in the town of Oettingen on the Wernitz, in 48° 57' N. lat. and 10° 38' E. long. The inhabitants, 3280 in number, are half Protestants, half Roman Catholics; there are 250 Jews. It is a well built town, has two palaces, a gymnasium, an elegant Lutheran church, a Roman Catholic church, a literary society, an orphan asylum, and manufactories of cotton, linen, and worsted.

The prince of Oettingen-Wallerstein has a territory of 252 square miles, partly in Würtemberg, partly in Bavaria, with 46,000 inhabitants. Wallerstein, the capital and residence of the prince, is a well built market-town, with 1500 inhabitants. The prince's palace is a handsome building, and contains a good library and a collection of paintings.

#### OFEN. [BUDA.]

OFFENBACH is the capital of a circle in the province of Starkenburg, in the grand-duchy of Hesse, and belongs to the mediatised princes of Isenberg-Berstein. It is situated in a very pleasant and fertile country, about a league from Frankfurt, on the bank of the Maine, over which there is a bridge of boats: it is surrounded on one side with a wall, on the other by a navigable canal which joins the Maine. It consists of the old and the new town, the latter of which is well built. The public buildings are a fine palace, a Lutheran, a French Calvinist, and 2 Calvinist churches, and a gymnasium. The population is 8000. Offenbach is the only considerable commercial and manufacturing town in the grand-duchy. The manufactures are, very various: the principal are leather, hats, silks, hosiery, earthenware, all kinds of lacquered goods, gold and silver wire, jewellery, snuff and tobacco, wax candles, white-lead, chocolate, and carriages, which are much esteemed all over Germany for lightness and durability.

OFFICE FOUND. By the common law of England, where the king is entitled, upon the occurrence of certain events, to take possession of real or personal property previously belonging to a subject, the facts upon which the king's title accrues must be first ascertained by an inquisition or inquest of office. This inquiry is executed by some officer of the crown, such as the escheator, coroner, or sheriff, or by persons specially commissioned for the purpose, and the facts are ascertained by a jury of an indeterminate number, but consisting usually, though not necessarily, of twelve men. Such inquests were much more frequent before the abolition of military tenures, when inquisitions *post mortem* were instituted upon the death of any of the king's tenants, to inquire of what lands he died possessed, and of other matters tending to establish the king's rights respecting the property of the deceased. [JURY.] When an inquisition of this kind has been executed and returned, it is said to be an *office found*. Thus where treasure has been discovered under circumstances which do not give it to the owner of the land, an inquest is held, and the king, upon office found, takes it; and where a person of illegitimate birth dies intestate, the king (if he is the immediate lord of the fee), upon office found, is entitled to all his land: in the latter case however the land is generally granted again to some person or persons who can make out the most reasonable claim to it. So also the verdict of a jury upon a coroner's inquest, declaring a person to have died *ut felo de se*, is an office found, upon which

the king becomes entitled to take possession of the property of the deceased.

OFFICE. HOLY (*Sanctum Officium*), is the name of an ecclesiastical tribunal established in the thirteenth century by popes Honorius III., Gregory IX., and Innocent IV., to try heretics, blasphemers, apostates, relapsed Jews or Mohammedans, witches and wizards, polygamists, and other persons charged with infractions of the canons of the Church. The judges of this court were called inquisitors, whence the tribunal itself has been commonly styled the 'Holy Inquisition.' The name of inquisitors, or inquirers after heretics, appears as early as the reign of Theodosius I., who, by his constitution against the Manichæans and other heretics, A.D. 382, after adjudging the punishment of death for several aggravated cases of heresy, directs that 'Inquisitores ad conquirendos et eruendos hereticos' be appointed by the prefect of the Prætorium. (*Codex Theodosianus, Gothofredi*, xvi., tit. 5, lex 9.) This is the first law under the Christian emperors by which the punishment of death is awarded for heresy. Constantine had only sentenced the Arians to banishment, though he threatened to punish with death those who should retain and make use of the books of Arius. The subsequent law of Honorius, A.D. 398, expels from the towns the 'Clerici' or priests of the Montanists and Eunomians, and if they persist in bringing people together, it banishes them for life. It further orders their books to be burnt, and condemns all persons who are found to conceal them to be beheaded. (*Cod. Theod.*, xvi., tit. 5, l. 34.) Two more constitutions or laws of Honorius (51 and 56 of the same book and title in the Theodosian Code) threaten with proscription and death those who publicly profess certain heresies. These are the oldest laws on record which make heresy a capital crime; but it ought to be observed, that there is no law in the whole Theodosian Code which subjects heretics in general to the pain of death, that punishment being reserved for the leaders, those who collected assemblages of people, made proselytes, and preached or spread certain heterodox doctrines specified and condemned by the laws. The trial and punishment in all such cases were left to the civil magistrate.

Previous to the time of Theodosius I. there had been persecutions of Arians by the Orthodox, and *vice versa*, carried on through the violence of individuals; but there was no specific law making heresy a capital offence. Towards the heathens the case was different. Constantius (A.D. 353) had forbidden heathen sacrifices under pain of death. Theodosius I. confirmed that law, and Theodosius II., after remitting the capital penalty (A.D. 423), put it in force again in 426. (*Gothofredus, De Statu Paganorum*.) Most of the earlier fathers, Tertullian, Cyprian, Lactantius, Hilarius, Ambrose, and Gregory Nazianzenus, and even Athanasius, openly disclaim violence as a means of enforcing unity and obedience to the Church. Chrysostom and Augustin however think that heretics ought to be prevented from holding assemblies, and ought to be confined or banished, but not put to death. But it ought to be remembered that the heretics of those times, the Arians and Donatists in particular, constituted political factions which rebelled against the authority of the state, murdered their antagonists, demolished their houses, and committed all sorts of violence, as may be seen by the letters of Augustin.

The first person on record who was juridically condemned and put to death for heresy is Priscillianus, the leader of a sect in Spain, in the latter part of the fourth century. Two Spanish bishops, one of whom was called Idacius, accused Priscillianus, with two other priests or bishops, before a council held at Bordeaux, A.D. 385. Priscillianus appealed to the emperor Maximus, who had assumed the imperial purple in Gaul, and who was then residing at Treves, whither Priscillianus and his friends were taken, being followed by their prosecutor Idacius. Martin, bishop of Tours, interceded in their behalf; but after his departure from Treves, Maximus entrusted Evodius, the prefect of the Prætorium, with the trial of the accused, and upon his report Maximus condemned them to be beheaded. This novelty was generally censured, and Ambrose and Martin of Tours strongly reprobated the part which Idacius had acted, and which they characterised as unbecoming the episcopal character. The consequence was, that Idacius was excommunicated, and died in exile.

Justinian, in the first book of his Code, in which he treats of the Catholic faith, and defines its creed according to the first four general councils, of Nicæa, Constantinople, Eph-

esus, and Calchedon, forbids public disputations upon dogmas, and enacts several penalties against heretics, Jews and apostates. In the 131st Novel, the same emperor says: 'We receive the doctrines of the four Holy Synods as the Divine Scriptures, and their Canons we observe as laws.' Thus the orthodox creed, as expounded in the four councils, became the law of the empire, an empire which was then administered despotically, and dissent from that creed was an offence against the law. From this principle the whole penal code against heretics was derived. But for several centuries after, cases of heresy were tried and penalties awarded by the ordinary courts, as the bishops had not then any temporal jurisdiction. In course of time however councils interfered, and after condemning particular tenets as heretical, specified in some instances the punishments to be inflicted upon heretics, Jews, and apostates. [Jews.] It became the practice for the bishops to examine the accused, and decide whether there were sufficient grounds for the charge of heresy against them; if the charge was proved, they were to admonish them, and convince them of their errors, after which, if the accused remained obdurate, the bishop handed them over to the secular court. 'Heretici perseverantes in errore relinquuntur Curie seculari judicio.' (Council of Tarracona, A.D. 1242.) And the law of Las Partidas, which is still the fundamental code of Spain, promulgated in 1258, says: 'Heretics may be accused by any one of the people before the respective bishop or his vicar, who must examine and interrogate them upon the various articles of the faith, and if they find that they err in them or in any other thing which the church of Rome commands to be believed and observed, he must endeavour to convert them and make them forsake their errors by means of good arguments and mild words. And when the penitents have acknowledged their belief, they are to be reconciled to the church and be forgiven. But if it so happens that they will not forsake their errors, the bishop must convict them as heretics, and then hand them over to the secular or lay judges.' The lay judges however were not mere executors of the episcopal verdict: they examined the proceedings, and having convinced themselves of their regularity, they awarded the penalty. By a clause of the same law of Las Partidas, 'the property of those who are condemned as heretics, or who die in the heretical belief, belongs to their children or other descendants.' The principle of confiscation is here not recognised. This was in the kingdom of Castile; but in Aragon, France, and Italy, a different process was introduced by means of the Inquisition.

In the council of the Lateran, convoked at Rome in 1215, by Innocent III., new and severe enactments were made against heretics, but the cognizance of matters of heresy was left to the ordinaries or bishops. But some years before this time, Innocent himself, of his own authority, had sent a commission consisting of two legates, who were Cistercian monks, accompanied by subordinate priests and officers, to the south of France, in order to extirpate the heresy of the Albigenses. These legates acted independently of the local bishops; they held their own court, before which they summoned, by the authority of the pope, individuals accused of heresy, and condemned, and inflicted penalties, and even capital punishments. Dominic de Guzman, the founder of the order of Dominicans, was one of the most zealous agents of this commission, the members of which were called Inquisitors. This however was only a temporary and local commission.

In 1208, Peter de Castelnau, one of the legates, who had become obnoxious for his severity, was murdered near Toulouse, and Innocent was so exasperated, that he preached a crusade against the Albigenses, which, after a long struggle, ended in their extermination. [ALBIGENSES.] Honorius III., the successor of Innocent, issued new provisions against heretics, which were enforced by the emperor Frederic II. in three constitutions, or laws, dated Pavia, A.D. 1224, by which he condemned impenitent heretics to death, and those who repented to perpetual imprisonment. In the year 1228 a severe penal law against heretics was enacted in the city of Milan by Cardinal Godfrey of St. Mark, papal legate, with the consent of the archbishop and the people: it was to the effect that 'no heretic should be allowed to remain in the state of Milan; that any person might lay hands on a heretic and bring him before the magistrates; that those who were convicted as heretics by the Ecclesiastical Court should be executed by the prætor within ten days.

their houses pulled down, and their property confiscated to the community.' (Calchi, *Historia Patria*, b. xiii.; Corio, *Storia di Milano*, part ii., p. 72; Verri, *Storia di Milano*, ch. ix.) No less than fifteen sects of heretics, with strange names, are enumerated by these historians as having been discovered within the state of Milan. The archbishop of Milan at the time was Enrico da Settala, who exerted himself greatly in rooting out the heretics, and having probably exceeded all bounds, he was at last banished by the council of the republic, for which the council and the podestà were excommunicated by the pope. In the inscription on the tomb of this archbishop, it was stated that 'being appointed inquisitor, he destroyed the heretics.' It was about the year 1233 that Pope Gregory IX. laid down the rules and defined the jurisdiction of the inquisitors' courts, which he sent to various countries, under the name of Inquisitorial Missions. He appointed as chief inquisitor in Lombardy, Pietro da Verona, a Dominican monk, who was strenuously seconded by the then podestà of Milan, Oldrado da Tresseno, who consigned to the flames numerous heretics. The likeness of this podestà was, not many years since, and probably is still, seen sculptured in relief in the façade of the hall of the municipal council at Milan, with an inscription recording, among other things, that he had burnt the heretics as in duty bound: 'Catharos, ut debuit, uxit.' The chronicler Fiamma says, that he was the first who put heretics to death in Milan. By degrees inquisitors were sent by the popes to most Italian cities and states, where, with the consent of the local authorities, they established their tribunal, and had their officers, notaries, informers, and other agents. Dominican monks were generally employed as inquisitors, as the principal object of the institution of their order was to defend the orthodox faith by arguing and preaching against heresy, on which account they are styled 'Fratres Prædicatores,' or brother preachers. The inquisitor Pietro da Verona, in the course of nineteen years, burnt a great number of heretics throughout Lombardy, banished or frightened away a still greater number, and confiscated their property. A certain Confaloniere of Alliate, being warned that he was on Fra Pietro's list, conspired with several of his friends, who lay in wait for the inquisitor, and on the 6th of April, 1252, as he was returning from Como to Milan, in company with another Dominican, they killed him near Barlassina, and wounded his companion, who died a few days after. The inquisitor was shortly after canonized by Pope Innocent IV., under the title of St. Peter Martyr. In 1277, another Dominican, brother Pagano da Lecco, was killed in the same manner in Valtellina.

The chroniclers of the various cities of Lombardy record the acts of the inquisitors, and the number of heretics and witches whom they put to death at particular times. The chronicle of Muraltò states that brother Antonio da Casale, inquisitor of Como, in 1416, sent three hundred heretics to the stake in one single year. Tartarotti states that in the year 1485 forty-one witches were burned at Como. Bartolomeo Spina, 'De Strigibus,' ch. 13, states that in the diocese of Como the number of those who were tried annually by the Inquisition exceeded one thousand; that the inquisitor employed eight, ten, and even more vicars, and that almost every year about one hundred persons were burned. (*Lettere del Conte Gianbattista Giovio all' Abate Bettinelli*, letter vi.)

The Inquisition was introduced into Rome as well as other parts of Italy by Gregory IX., and entrusted to the Dominicans, but it was a long time before it was established as a distinct and permanent court. Inquisitors were appointed by the pope on particular occasions, who visited the various provinces and towns, proclaiming to all persons the obligation they were under of informing against those whom they knew or suspected of being heretics, under pain of excommunication. At the same time they also made it known that all persons guilty of heresy who came of themselves before the inquisitor within a certain fixed period, and accused themselves and professed repentance, should receive absolution and be only subject to a canonical penance. These penances were public, humiliating and very severe, as may be seen by a letter of St. Dominic concerning a heretic whom he had converted, by the acts of the council of Béziers, A.D. 1233, and of the council of Tarracona in 1242. After the expiration of the period of grace, the inquisitor proceeded *ex-officio* against those who were denounced, the name of the informer being kept secret: he examined witnesses privately in pre-

sence of a notary and two priests, and having taken down the evidence in writing, he read it over to the witnesses, who were asked whether they confirmed what had been read. If there appeared to be sufficient grounds for proceeding against the accused, the inquisitor ordered his arrest by the municipal officers, and he was taken to the convent of the Dominicans, if there was one in the town, or to the prison of the ecclesiastical court. He was then interrogated by the inquisitor, and his answers might be used afterwards as evidence against him. If the accused denied the charge of heresy, he was supplied with a copy of the instruction and depositions, but without the names of the accuser and witnesses, and with the omission of such circumstances as might discover them. The accused having made his answer or defence, which was taken down in writing, if he denied the charges, the inquisitor, together with the bishop of the diocese or his delegate, if they thought proper, ordered him to be put to the torture in order to obtain his confession. The torture might be repeated three times, but it was afterwards ordered to be applied only once; this regulation however was often evaded by suspending the tortments and then resuming them, and considering the whole as one torture. If in the end there were not sufficient grounds for the conviction of the prisoner, he was declared to be 'suspected of heresy,' was obliged to make a public abjuration of all heresies, and was subject to certain penalties, according to the nature of the case. If the accused was convicted of heresy, but professed his repentance, he was condemned to prison for life, a penalty which however might be mitigated by the inquisitor. But if he was a *relapsed*, that is to say, had been tried before, and found guilty or only strongly suspected, there was no mercy for him; he was 'relaxatus,' that is to say, given over to the lay magistrate, who, according to the civil and canon laws, was bound to put him to death upon the sentence of the inquisitor which declared him a heretic. The only favour shown to the relapsed heretic who confessed and abjured his guilt was, to be strangled before he was burnt. If the convicted heretic was not relapsed, but impenitent, a respite of the sentence was granted in order to effect his conversion, and if he at last abjured, his life was spared, and he was sentenced to perpetual imprisonment. If he persisted in his impenitence, he was publicly burned alive. Such were the principal characteristics of the old or delegated Inquisition as it existed from the thirteenth century to the latter part of the fifteenth, and the regulations of which are found in the 'Directorium Inquisitorum' of Friar Nicholas Eymeric, a native of Catalonia, and a Dominican monk of the fourteenth century, who held the office of chief inquisitor in Aragon for forty-two years.

The Inquisition had nearly fallen into disuse in the kingdom of Aragon in the fifteenth century, in consequence of the total extinction of the heretical sects in the south of France, whose spreading on the other side of the Pyrenees had occasioned the introduction of the inquisitorial courts into Catalonia and Aragon. In the kingdoms of Castile and Leon and of Portugal, the Inquisition had not yet taken permanent root. But towards the end of the fifteenth century, the Holy Office was introduced into Spain under a new and more appalling form, and became consolidated and permanent, and more absolute and independent than in any other country of Europe. This is what is designated by Llorente and other writers by the name of the 'Modern or Spanish Inquisition.'

Alfonso de Hodeja, prior of the Dominican convent of Seville, and Friar Philip de Barberis, inquisitor of the kingdom of Sicily, which was then subject to the crown of Aragon, suggested to Ferdinand and Isabella, in 1477, the establishment of the Inquisition in Spain for the purpose of punishing those Christians who secretly relapsed to the Jewish faith. The converts, or children of converts, from Judaism, were looked upon with dislike and mistrust by the old Christians; and many of them were at the same time among the wealthiest merchants and monied men of Spain, and as such had numerous debtors. Reports were spread of their secret meetings with those who had remained Jews, of their profaning the images of Jesus Christ, and even crucifying Christian children. Ferdinand easily listened to the suggestion; but Isabella, a princess of mild character, hesitated for some time, and without her consent nothing could be effected in the dominions of the crown of Castile. Means were at last found to alarm her conscience: she was told that the interests of religi-

required her acquiescence, and accordingly she solicited, by means of her ambassador at Rome, a Papal bull, authorising the establishment of the Inquisition in the kingdom of Castile. The bull, despatched from Rome in November, 1478, authorised Ferdinand and Isabella to appoint two or three bishops or other dignitaries of the church, aged at least forty years, of irreproachable character, graduates in theology and the canon law, who were to be commissioned to seek after and discover, throughout the dominions of the Spanish sovereigns, all apostates, heretics, and their abettors, with full power to proceed against them according to law and custom. Isabella however suspended the execution of the bull for two years, desiring at the same time that measures of persuasion should be adopted to warn the relapsed converts of their error and of their danger. A catechism was composed expressly for them, and several pamphlets against Judaism were issued. In 1480 the Cortes of Castile assembled at Toledo, and passed several restrictive measures against the Jews, with the view of checking their intercourse with the Christians. Nothing however was said in that assembly about the Inquisition. At last, in September, 1480, Ferdinand and Isabella, who were then staying at Medina del Campo, appointed two Dominicans as inquisitors, with an assessor and a fiscal attorney; and on the 9th of October a royal order was despatched to the governors of provinces to furnish the new inquisitors and their retinue with everything necessary for their journey to Seville; and at the same time their privileges were declared, which were the same as those granted by the emperor Frederic II. to the inquisitors in Italy in the thirteenth century. The inquisitors established their court in the Dominican convent of St. Paul of Seville, whence, on the 2nd of January, 1481, they issued their first edict, by which they ordered the arrest of several 'new Christians,' as they were styled, who were strongly suspected of heresy, and the sequestration of their property, denouncing the pain of excommunication against those who favoured or abetted them. The number of prisoners soon became so great, that the Dominican convent not being large enough to contain them, the court was removed to the castle of Triana, in a suburb of Seville. The inquisitors issued another edict, by which they ordered every person, under pain of mortal sin and excommunication, to inform against those who had relapsed into the Jewish faith or rites, or who gave reason for suspecting them of being relapsed, specifying numerous indications by which they might be known. Sentences of death soon followed; and in the course of that year, 1481, 298 new Christians were burnt alive in the city of Seville, 2000 in other parts of Andalusia, and 17,000 were subjected to various penalties. The property of those who were executed, which was considerable, was confiscated. (Mariana, *Hist. de España*, b. 24, ch. 17.) The terror excited by these executions caused a vast number of new Christians to emigrate: several who were condemned as contumacious repaired to Rome, and appealed to Pope Sixtus IV. against the inquisitors. The pope wrote to Ferdinand and Isabella, in January, 1482, complaining of the arbitrary conduct of the two inquisitors appointed by them, revoking the authority which he had given to their majesties to appoint other inquisitors, and reserving that right to himself, which he exercised by a brief in the following February. Among these new appointments was that of the afterwards famous Torquemada. Queen Isabella now wrote to the pope, requesting him to give a permanent and fixed form to the new tribunal, and to make its judgments definitive without appeal to Rome, complaining at the same time that she was accused of doing all that she had done in favour of the Catholic faith, for the sake of the confiscations which follow the condemnations. The pope laid the proposal of Isabella before a committee of Spanish cardinals and bishops who were then at Rome, and among whom was Rodrigo de Borja, afterwards pope Alexander VI. By their advice Sixtus IV. despatched a brief to Isabella, appointing Manrique, archbishop of Seville, to be apostolic judge of appeal for all Spain, with power to decide on all appeals from the judgments of the Inquisition. By several other briefs, directed to the various archbishops of Spain, the pope gave them the power and regulated the manner of appointing the ordinary inquisitors in the various dioceses. Notwithstanding these measures, appeals from Spain continued to be received at Rome; and the pope again wrote, in August of the same year, to the archbishop of Seville, ordering the proceedings against several individuals to be quashed, and recommending mildness and moderation.

This recommendation however had no effect. Soon after the pope appointed Thomas de Torquemada, prior of a Dominican convent of Segovia, to the new dignity of inquisitor-general of the kingdom of Castile; and by another brief, dated 17th October, 1483, he made him likewise inquisitor-general of the kingdom of Aragon, with full jurisdiction over all other inquisitors in Spain and its dependencies. His powers were confirmed by Innocent VIII. in February, 1486. Torquemada chose for his assessors as counsellors two jurists, J. Gutierrez and Tristan de Medina; he created four subordinate courts, at Seville, Cordoba, Jaen, and Villa Real; the last was soon after transferred to Toledo. The Dominican monks, who had been appointed inquisitors by the pope in February, 1482, at first refused to submit to the authority of Torquemada, but they finally yielded. Ferdinand at the same time appointed a royal council of the supreme Inquisition, 'Consejo de la Suprema Inquisicion,' of which the grand-inquisitor was president of right and for life, and a bishop and two doctors-at-law were counsellors. The counsellors had a deliberative vote in all matters of civil law, but the president alone judged all matters which concerned the canon or ecclesiastical law.

Torquemada and his two assessors framed the organic laws of the new tribunal, which were styled 'Instructions, and were partly based on the older 'Directorium Inquisitionum' of Eymeric. Being sanctioned by a junta of the inquisitors of the four courts which he had established and of the royal counsellors, the instructions, consisting of 22 articles, were promulgated at Seville, the 29th October, 1484. They are given at length by Llorente, in the sixth chapter of his History. New articles were added to them in 1488 and 1498, and lastly the inquisitor-general Valdez, in 1561, compiled a new series of ordinances in 81 articles, which regulated ever after the practice and proceedings of the Spanish Inquisition. They are also given by Llorente, in the 22nd chapter of his work. They are substantially the same as those already noticed as being in practice by the old Inquisition, but are more minute, and rather more unfavourable to the accused. By the old practice, for instance, the names of the witnesses for the prosecution were in many cases communicated to the accused, to whom they were of great use for his defence. Confiscation of the property of those who were condemned was not generally enforced under the old practice, and this was more particularly the case in the kingdom of Aragon, a circumstance which explains the resistance of the Aragonese, among whom the old or delegate Inquisition had been established for centuries, to the introduction of the new Inquisition as instituted by Torquemada.

Another important characteristic of the new Spanish Inquisition was its compact organization and independence of all other authorities. The inquisitor-general was appointed for life; he was proposed by the king and approved by the pope. He appointed all other inquisitors under him, as well as visitors and other agents. He had full and discretionary power by the papal bulls in all matters of heresy. The grand-inquisitor, being thus placed as a distinct power between the king and the pope, was in reality independent of both. He could refuse to submit to those papal decretals and bulls which he did not approve, by alleging that they infringed upon the rights of the Spanish monarchy; and he could likewise evade the king's ordinances, by alleging the papal bulls which forbade the inquisitors to tamper with the secular power under pain of excommunication. Among other proofs of this assumed irresponsibility, one of the strongest is the famous trial of Carranza, archbishop of Toledo, in the reign of Philip II., who had attended Charles V. at St. Yuste in his last moments, and whom neither the briefs of the pope Pius IV. nor the remonstrances of the prelates assembled at the council of Trent could save from being confined in the prisons of the Spanish Inquisition for more than seven years, without a termination of his trial; and when at last pope Pius V. demanded of the Spanish inquisitor and of the king, under pain of excommunication, that the archbishop and the papers of his trial should be sent to Rome, all sorts of obstacles were thrown in the way of his departure and his final acquittal by the pope. After the death of Pius V. new proceedings were commenced in Spain to prove the archbishop guilty of heresy, and on the information being transmitted to Rome, Gregory XIII., who had succeeded Pius V., was, though with evident reluctance, induced to declare, on the 14th April, 1576, that the archbishop of Toledo was strongly suspected of believing sixteen



propositions qualified as Lutheran, and which had been deduced from the context of his writings by the casuists of the Inquisition. He was then sentenced to five years' confinement in a Dominican convent and other canonical penances. A few days after this sentence, the archbishop, who was then seventy-two years of age, was taken dangerously ill, and before receiving the sacrament, on the 30th April, he solemnly declared in presence of several witnesses 'that he had never fallen into the errors with which he had been charged; that his expressions had been distorted into a meaning totally different from his; that he however humbly submitted to the judgment pronounced by the sovereign pontiff, and heartily forgave all those who had taken part against him in the trial, and would pray for them before the throne of Grace.' On the 2nd of the following May the archbishop died in the convent of La Minerva at Rome, in which he was detained, and where he was buried. An inscription was placed over his tomb by order of Gregory XIII., in which he was described as a prelate 'illustrious for his birth, his life, his doctrine, his preaching, and his charity.' Llorente gives a copious abstract of this celebrated trial in chapters 32, 33, and 34 of his *History of the Inquisition*.

Pope Paul III., alarmed at the progress of the doctrines of the Reformation, with the consent of Charles V. sent inquisitorial commissioners to the various states and provinces of Italy to try heretics; but they were instructed to proceed according to the usual form of the ecclesiastical courts, the depositions and names of the witnesses were to be communicated to the accused, and sentence of condemnation was not accompanied by confiscation; in short their powers were very different from those of the Spanish Inquisition. The Spanish viceroy of Naples, Don Pedro de Toledo, applied to the pope for an inquisitorial commissioner with a brief to proceed against persons suspected of heresy, but the Neapolitans, who were acquainted with the severities of the Spanish Inquisition, revolted, and, after much bloodshed, Charles V. promised that no Inquisition should be established in the kingdom of Naples, and that cases of heresy should be tried, as before, by the ordinary episcopal courts. These occurrences took place in 1546-7, and the Neapolitans, the better to secure themselves against the dreaded tribunal, established a court whose office it was to watch against any attempt to introduce the same under any shape—a kind of inquisition against the Inquisition. This court, which continued to exist till the French invasion of 1799, was styled 'Tribunale contro quello del Sant Uffizio,' and was composed of deputies, chiefly noblemen chosen by the different Seggi into which the Neapolitan nobility was classed. To the Neapolitan character, mercurial and communicative, the secret and mysterious proceedings of the Inquisition were peculiarly obnoxious.

Philip II. wished to introduce the Spanish Inquisition into the duchy of Milan, but the towns of Lombardy sent deputies to the council of Trent to remonstrate against it, and the Milanese and other Italian bishops wrote to the pope and to Cardinal Borromeo, representing that the Inquisition of Spain acted in the dark, in an arbitrary manner, and with strange and fearful forms of proceeding, that it took away the jurisdiction from the bishops, that it showed itself more a rival than a subject to the papal see, that it had repeatedly refused to send a copy of its trials to Rome, and that if it were introduced into Italy, the Italian prelates, having its terrors before their eyes, would become estranged from the holy see. The pope, being easily persuaded by these reasons, interposed with King Philip, saying that if required he would, after consulting with the bishops of Lombardy, himself send inquisitorial commissioners from Rome, who should proceed not according to the Spanish form, but according to the canon law, and without prejudice to the episcopal authority. Thus the Spanish Inquisition was not introduced into Milan or into any other Italian state, with the exception of Sicily, which was an old dependency of the crown of Aragon.

The court of the Inquisition, as it was established in the sixteenth century, in Tuscany, Venice, Milan, Parma, and other Italian states, consisted of one inquisitor, sent from Rome, with assessors approved by the sovereign of the respective states, who appointed deputies or commissioners to attend the trials and report to him. The sentences of the court were subject to the sanction of the temporal sovereign.

The republic of Venice showed itself the most jealous of P. C., No. 1028.

its sovereign rights in this particular. A series of statutes were issued at various times by the senate to regulate the proceedings of the inquisitors, which are given by Paolo Sarpi, in his 'History of the Venetian Inquisition,' and by Limborch, b. i., ch. 17. By a concordat with Pope Julius III., A.D. 1551, it was decreed that three senators were to attend all the proceedings and judgments of the Inquisition in the city of Venice, and although they took no part in the trial, they had the right to suspend the execution of the sentence and report to the senate. In the provincial towns lay magistrates were appointed to perform the same duty in the respective courts of the Inquisition. The Inquisition could not molest Jews or other unbelievers, or Greeks living under the protection of the republic. It could not take cognizance of cases of blasphemy or polygamy—which belonged to the secular jurisdiction—nor of witchcraft, nor of minor infractions of discipline, such as eating or selling of meat on Fridays, &c. Numerous other checks are provided by the same statutes. In short, although the Venetian senate was obliged by prudential reasons to admit the Inquisition within its territories, it took care to render it as inoffensive as possible. The famous tribunal of the state Inquisition, which was entirely a political institution of the Venetian aristocracy, and must not be confounded with the ecclesiastical Inquisition, is described under VENICE.

In Tuscany the grand-dukes Medici had provided that deputies appointed by themselves should attend the trials of the inquisitorial court, and should report to them, and that no sentence should be executed without their sanction. But in the year 1566, pope Pius V., a zealous promoter of the Inquisition, demanded of the grand-duke Cosmo I. the person of Pietro Carnesecchi, a man of some rank and learning, and well affected to his sovereign, but who had publicly adopted several tenets of the Protestant Reformers. Cosmo gave him up to the officers of Rome, but at the same time wrote earnestly to the pope to save him. Pius was inclined to spare his life, if Carnesecchi had shown signs of repentance, but he boldly persisted in his opinions, and in August, 1567, he was convicted by the Roman Inquisition of thirty-four heretical tenets, and condemned to death. The grand-duke again wrote in his behalf, and the pope suspended the execution for ten days, promising to spare his life on condition that Carnesecchi should abjure his tenets, and he sent him a friar to exhort him to do so. But Carnesecchi remained firm: he argued with the monk and wanted to gain him over to his own opinions. He was publicly beheaded at Rome, and afterwards burnt. In the following century Galileo was summoned from Florence to Rome, where however he was treated with considerable lenity, and after a verbal abjuration and a few months' confinement, he was allowed to return to Florence. The executions in Tuscany in consequence of sentences of the Inquisition have been comparatively few. The tribunal continued to exist in Tuscany till the reign of Leopold of Austria, who began by curtailing its jurisdiction, took away its 'sbirri,' or bailiffs, gave the censorship of books to a lay magistrate, and at last abolished the tribunal altogether in 1787. About the same time it was suppressed at Milan by the emperor Joseph II. In 1769 the duke of Parma abolished it in his territories.

Pope Paul III. founded at Rome, by a bull dated April, 1643, the Congregation of the Holy Office, consisting of six cardinals, who were styled 'inquisitors-general of the faith,' who had the superintendence over all other inquisitors, and he gave them full authority to proceed, without the concurrence of the ordinaries or bishops, against all heretics or persons suspected of heresy, to punish them, confiscate their property, to degrade and deliver to the secular courts all clerical offenders, to call in if required the assistance of the secular arm, to appoint inquisitors with such powers as they thought proper, to appoint fiscal attorneys, notaries, and other officials, and to hear and decide on appeals from the judgment of other inquisitors. The pope however declared that by this bull he did not intend to make any alteration in the privileges of the Spanish Inquisition as then established.

In 1564 popes Pius IV. and V. confirmed and extended the powers of the Roman Inquisition, which however were resisted in the kingdom of France. In that kingdom there was no regular tribunal of the Inquisition. The Cardinal de Lorraine, under Henri II., had indeed appointed delegated inquisitors who acted as extraordinary judges in the trials of

the Huguenots, but their jurisdiction was not exclusive, as the parliament also took cognizance of the crime of heresy, besides which the king appointed special commissioners for the same purpose. (*Histoire du Parlement de Paris*, ch. 21.) But the authority of the Inquisition was totally abolished in France as soon as tolerance was established by the Edit de Nantes under Henri IV., which allowed the Protestants the exercise of their religion, for tolerance and the Inquisition could not possibly exist together; and although Louis XIV. afterwards revoked that edict and persecuted the Protestants, he did it by means of the secular power, and took care not to allow the introduction into his kingdom of an ecclesiastical tribunal which would encroach upon his own sovereign authority. But he advised his grandson Philip V., whom he placed on the throne of Spain, to maintain the Inquisition as a means of ensuring the tranquillity of that kingdom.

Sixtus V., in 1588, having distributed the cardinals into fifteen congregations or boards, made that which was styled 'Holy Roman and Universal Inquisition' to consist of twelve cardinals with several prelates as assessors, including the Master of the sacred palace, several monks with the title of 'consultors,' besides other clergymen and lawyers called 'qualificators,' whose business it was to prepare the cases. This is the Inquisition which still subsists at Rome, but its jurisdiction does not extend beyond the limits of the Papal State, and it is generally understood that its powers are exercised with considerable leniency and caution. Pius VII., after his restoration, is said to have abolished the use of the torture.

The Roman Inquisition watches more particularly over the conduct of the clergy, and has also the censorship of the press and of the introduction of foreign works. Provincial inquisitors reside at Bologna, Ferrara, and other towns of the Papal State, which is now the only country in which the tribunal of the Holy Office still remains.

In Germany and in Poland, the Inquisition has long since ceased to exist. In Spain it was suppressed, first by a decree of Napoleon, dated Chamartin, 4 December, 1808, as encroaching upon the rights of the sovereign, 'attentatoire à la souveraineté.' This decree however was only enforced in those parts of the monarchy which were occupied by the French.

On the 12th February, 1813, the extraordinary Cortes of Spain assembled at Cadiz definitively suppressed the Inquisition, as being incompatible with the new political constitution of the monarchy. At the same time they restored to the bishops the exercise of the ecclesiastical jurisdiction in cases of heresy. An interesting abstract of the long debate which took place upon this important question is given by Agustin de Arguelles, in chapters x. and xi. of his 'Examen Historico de la Reforma Constitucional,' 8vo., London, 1835.

Ferdinand VII., after his restoration, re-established the Inquisition by an ordinance of the 21st July, 1814, and appointed the bishop of Almeria inquisitor-general. In this act Ferdinand stated to the people that one of his objects in re-establishing the Inquisition was 'to repress the mischief occasioned to the national faith by the presence of the foreign troops which were not Catholic,' including of course his allies the English, who had been the chief means of restoring him to the throne. The new inquisitor-general published an edict, on the 5th of May, 1815, in which, after deploring the progress of infidelity and the corruption of morals, he proposes to employ against these evils not the fiery zeal of those apostles who would have called down the fire of heaven upon Samaria, but the milder spirit of their Divine Master, and he exhorts all offenders against the laws of the Holy Office to come and acknowledge their errors before the end of the year, in order to receive private absolution without any public penance.

The Inquisition continued in Spain till the Revolution of 1820, when it was again suppressed by the Cortes. During these five years of its re-establishment, many persons were arrested, but none appear to have been put to death in consequence of its judgments. When Ferdinand, in 1823, a second time overthrew the constitution, he did not re-establish the Inquisition. In Portugal, the Inquisition, which was likewise abolished by the Cortes, has not been restored.

Various and often exaggerated accounts have been published of the number of persons put to death by the Spanish

Inquisition during the three centuries of its existence. Llorente, who wrote with calmness and had access to the archives of the tribunal, gives an approximate estimate of the number executed under each inquisitor-general, from which it results that the total amount in Spain is about 32,000 persons burnt, either alive or after being strangled, 17,000 burnt in effigy, and 291,000 condemned to various terms of imprisonment, to the galleys, or subjected to other penalties. During the eighteen years of Torquemada's inquisitorship alone, about 8800 persons were burnt. This calculation does not include the Spanish colonies, nor the islands of Sicily and Sardinia, which were long subject to the Spanish Inquisition. It is impossible to ascertain the amount of the victims of the Inquisition in these as well as in other countries of Europe. The last person burnt by the sentence of the Inquisition in Spain was a woman accused of having formed a contract with the devil. She was burnt at Seville, on the 7th November, 1781. The three last inquisitors-general, from 1783 to 1808, did as sentence any one to death.

In examining the history of the Inquisition under its various forms, two things ought to be carefully distinguished: the principle and the practice of that remarkable institution. The fundamental principle of the Inquisition is that heresy, that is to say, dissent from the tenets of the Roman church, is a heinous crime, and liable to both spiritual and temporal punishment. This principle however is not peculiar to the Inquisition: it is that of the canon law, and it has the countenance of the Roman law in several constitutions of the early Christian emperors. In every country therefore in which the canon law has civil or temporal force, the principle subsists, although it may lie dormant. A subject of such a country who should openly dissent from the established Church is liable to prosecution by the episcopal or the secular courts. This is still the case in several states of Italy, and even in Spain and Portugal under their new constitutional governments, at least until a new code shall be enacted. It must not be forgotten that the Inquisition was established in Spain while the Cortes of Aragon and Castile were still in full vigour. It is not long since the minister of justice stated in the Spanish Cortes that laws were still in force by which persons, dying in a state of heresy, cannot bequeath their property. It is not therefore sufficient for the Inquisition to be abolished in a country, in order to ensure liberty of conscience; it is not even sufficient for this purpose to establish a representative or republican government, as long as the canon law remains in force and the majority of the people do not tolerate dissent. In the small democracies of the forest cantons of Switzerland, which are exclusively Roman Catholic, no dissent from the church is allowed, and persons accused of heresy are severely punished or obliged to emigrate.

In speaking of religious liberty, people are apt to confound three things very distinct, such as toleration, liberty of conscience or of opinion, and full religious liberty. Toleration properly applies to foreigners who profess a different faith from that established in the country which they come to visit or inhabit for a time, and who are tolerated, that is to say, allowed to remain unmolested, and in some cases are permitted to have chapels of their own communion. This is now the case in almost every European country, at least with regard to particular Christian communions and to the Jews. The Lutherans and Calvinists have chapels in almost every Catholic state, and even at Rome and Naples. But this toleration is not a legal right; it is only granted during pleasure to certain nations and sects, and it applies only to foreigners and by no means to natives. Even during the rule of the Inquisition in Spain, English, Dutch, and other Protestant merchants were allowed to reside in the seaport towns, but only so long as they gave no scandal or offence to the Catholic faith, and their position was therefore extremely delicate and insecure.

Liberty of conscience applies to natives as well as to foreigners, and in the country where it is recognised, no one can be molested for his religious opinions or private religious practice. But the law regulates whether and under what conditions chapels or places of religious worship may be opened which dissent from the established church of the country. Much is left to the discretionary power of the executive. Thus in France, wherever there are in a town a certain number of Lutherans or Calvinists, they are allowed to have a place of religious worship, subject to certain regulations of the local authorities. In the Austrian states, by the

edict of the emperor Joseph of 1784, wherever there are 100 families of Protestants in one place, they may ask of the authorities permission to open a place of worship. Liberty of conscience is only found in countries where a considerable part of the population dissent from the established church; it does not exist in the Italian states or in other countries exclusively Roman Catholic. All the Protestant states of Europe allow liberty of conscience.

Full religious liberty is said to exist when not only every man may hold what opinions he pleases, but when every Christian sect may openly profess its faith and perform publicly its rites; and this not by especial permission, but as a matter of legal right. This is the case at present only in England and its colonies, and in the United States of North America. But even those countries cannot be said to have unlimited religious liberty, for this would mean that any one might set up any form of worship that he pleased. Now it cannot be believed that Fetish or other pagan rites would be publicly allowed in England or America. Therefore the religious liberty of England and America can only be said to extend to the various Christian and Jewish communions. And indeed it is questionable whether religious liberty in its full unlimited extent could exist in any orderly community of which the majority believe in any religion whatever; for what would be called liberty by some, would appear offence and scandal to the rest. Besides which the danger of proselytism must necessarily complicate the question still more. Mohammedans tolerate Christians and Jews, but will not allow any one to apostatise from the Koran. In the great French revolution, even those who professed to disbelieve all revealed religion, and who advocated full religious freedom, when they came to have the power in their hands, would not allow the people to worship God according to the old custom, but shut up the churches, persecuted the priests, and denounced religious meetings as treasonable. They would allow no dissent from incredulity. So much are men of all ways of thinking disposed to intolerance towards those who differ from them, not only in religious matters, but also in matters political, social, and even literary or scientific.

In the case however of countries in which penal statutes exist against heretics, it is still an important question how and when and by whom those statutes are to be enforced. We have seen how the Inquisition did enforce them, and the general opinion of Europe, not merely of Protestant but of Roman Catholic Europe, has reprobated and rejected its practice. The secular power has now taken into its own hands criminal jurisdiction in all its branches in every European state, with the single exception already mentioned of the Papal State, where, the government being in the hands of ecclesiastics, the jurisdiction of the canon law is kept distinct from that of the civil law, and has its own courts, of which that of the Inquisition is the principal. The secular power, at present, even in countries exclusively Roman Catholic, does not encourage spies and informers to pry into men's religious sentiments; it does not, like the Inquisition, consider men guilty merely because they silently dissent from the rites of the established church; it observes the essential distinction between opinions and acts, and leaving the former to man's conscience, it takes cognizance of the latter only. In so doing it goes back to the principle of the Theodosian and Justinian codes, whose constitutions against heretics were directed against those who made an open practice of their heterodox opinions, who assembled meetings, preached or spread their doctrines by writing, attempted to make proselytes, and thus disturbed the unity of the church and the tranquillity of the state. They were punished, not so much as heretics, but as rebels against the law, and their open acts were evidence against them. It was only in the thirteenth century that the Inquisition set about discovering private and silent heretics, and having once established the principle that it was necessary to ferret out, as it were, all individuals who dissented in their minds from the orthodox church, all kind of means were thought lawful for that purpose. Hence a system of secret and even anonymous denunciations was encouraged, domestic privacy was invaded, acts innocent in themselves were construed into guilt, and ample opportunities were given to private malice and revenge, as the informers were safe from the risk of discovery. The bad character of an informer or his relative position towards the accused was no objection to his denunciation being received, whilst, by a striking contrast, the Inquisition would closely scrutinise the character of the witnesses whom the accused called in his defence. Con-

fessors were bound to exact of their penitents, under pain of non-absolution, that they should go and denounce to the Holy Office any person of whom they knew or had heard any thing which appeared contrary to the Roman Catholic faith. The witnesses summoned by the Inquisition for the prosecution were not informed of the subject on which they were called upon to give evidence, but they were asked at first whether they had seen or heard anything of any one which appeared obnoxious to the faith and to the rights of the Holy Office. At the preliminary examination of the prisoner, he was not made acquainted with the charges against him, but was told generally that there were good grounds of accusation against him, which he was left to guess, and that if he confessed all, he should be treated with mercy. Afterwards even the act of accusation of the fiscal attorney was not communicated to him in writing, but the particular charges were read to him in the hall of audience, and he was interrogated on each head, whether it was the truth. When the accused was called upon for his defence, he was obliged to choose for his counsel one among the list of the Inquisition lawyers, who was not permitted to communicate with him in private, and who did not know the whole of the proceedings nor the names of the witnesses. The limits of this article do not allow us to proceed further in exhibiting the other peculiarities of this strange system of proceedings, but the reader will find a full account of them in Llorente's chap. ix., on the proceedings of the Spanish Inquisition, and in Limborch's b. iv., on the mode of proceeding of the Inquisition in general. It was the horror of this terrific code which made nations revolt against this tribunal, which excited the war in the Netherlands that lasted nearly half a century and ended in the separation of one half of the country from the crown of Spain, which caused rebellions in Aragon, Sicily, Sardinia, and Naples, and embittered the religious feuds and wars of the sixteenth and seventeenth centuries. And yet with all the ingenuity displayed for the discovery and conviction of heretics, it is averred that a great number of individuals put to death by the Inquisition were orthodox Catholics. Among other proofs of this are the letters of Pietro Martire d'Angleria, councillor of the Indies, quoted by Llorente, ch. x., the trials of Carranza and many other bishops, and even of persons who have been since canonized by the Roman church, such as St. Francis de Borja, St. Ignatius Loyola, St. Thérèse, St. Juan de la Cruz, &c. Even popes have not escaped the attacks of the Inquisition. Sixtus V. having published an Italian translation of the Bible, the Spanish Inquisition placed it upon its index of forbidden books. The same Inquisition condemned the works of Cardinal Noris, a friend of Benedict XIV., who wrote in a strong manner to the inquisitor-general on the subject. These and other disputes of the Spanish Inquisition with Pius V., Clement VIII., and other popes, amply prove the little deference which it paid to the papal authority whenever it came in opposition to its own assumed supremacy.

It is an error to suppose that intolerance is peculiar to the Roman Catholic church; all churches and religions, Jews, Mohammedans, and heathens, Arians and orthodox, Greeks and Latins, Protestants and Catholics—all have persecuted in turn; but no other church or sect ever invented or enforced for centuries a permanent system of persecution that can be in any respect compared with that of the Inquisition.

**OFFSETS** are lines drawn perpendicular to the chord of an arc, or the longest base of an irregular polygon, from points in the arc, or corners of the polygon. By means of these offsets the area contained between the chord and arc can be found with sufficient nearness. We mention this well-known term of surveying to direct attention to the article **QUADRATURES, METHOD OF**, which contains the set of successive approximations of which the surveyor's process is the first and rudest step.

**OGLETHORPE, GENERAL.** [GEORGIA.]

**OGYGES, or OGYGUS** (*Ὀγγυγης, Ὀγγυγος*), is said to have been the first king of Athens and of Thebes. (Tzet., *Lycoph.*, 1206.) Thus Pausanias tells us that the Ectenes, who were the most ancient inhabitants of Bœotia, were the subjects of Ogyges, and that Thebes itself was called Ogygian, an epithet which is also applied to it by Æschylus. (Paus., ix. 5, § 1; Æsch., *Pers.*, 37.) That Ogyges was closely connected with Thebes as well as Attica appears from the tradition, according to which he was said to be the son of Bœotus. (Schol. on Apollon., iii. 1178.) It ma-



be mentioned that the oldest gate in Thebes was called Ogygian. (Paus., ix, 8, 3.)

The name of Ogyges is connected with the antient deluge which preceded that of Deucalion, and he is said to have been the only person saved when the whole of Greece was covered with water. We possess scarcely any particulars respecting him; and the accounts which have come down to us are too vague and unsatisfactory to allow us to form any satisfactory opinion on the subject. He clearly belongs to mythology rather than to history. The earlier Greek writers, Herodotus, Thucydides, Xenophon, &c., make no mention of his name; but the accounts preserved by Pausanias and other writers appear to indicate the great antiquity of the traditions respecting him. Various etymologies have been proposed of his name. Mr. Kenrick supposes that the word was derived from the root *γυγ*, signifying darkness or night, and quotes a passage of Hesychius in support of his view, which appears however to be corrupt. The more favourite theory of modern scholars connects the name with Oceanus; which etymology is supposed to be supported by the tradition which places Ogyges in the time of the deluge. In support of this view it is remarked that Ogyges is only a reduplication of the radical syllable *Og* or *Oc*, which we find in Oceanus, and in Ogen (which is explained by Hesychius as equivalent to Oceanus, 'Ὠγήν, Ὠκεανός'); and that a similar reduplication takes place in *ἔνυμος, ἐτήνυμος, ὄπτομας, ὀπιπτεύω, ἀταλος, ἀτιτάλλω*. But these are mere guesses. The name of Ogygia is supposed to be applied to the island of Calypso because it lay in the ocean. But whatever may be the etymology of the name, the adjective derived from it is frequently employed by the Greek writers to indicate any thing antient or unknown. We learn from the Scholiast on Hesiod, that according to one tradition Ogyges was the king of the gods; and it is not improbable that the name originally indicated nothing more than the high antiquity of the times to which it referred.

(*Philological Museum*, No. 5, 'On the early Kings of Attica,' by Mr. Kenrick; No. 6, 'Ogyges,' by Mr. Thirlwall.)

#### OHIO, River. [MISSISSIPPI, River.]

OHIO, one of the states of the North American Union, lies between 38° 30' and 42° N. lat. and 80° 30' and 84° 50' W. long. It extends from east to west 220 miles in length, and its breadth from north to south varies between 93 and 200 miles; its average breadth may be 182 miles. On the west it is divided from the state of Indiana by a meridian line running south to the Ohio river, and measuring 170 miles. On the north lies the state of Michigan, from which it is separated by a straight line 80 miles long. Lake Erie, which borders it on the north and north-east, forms a coast-line of more than 150 miles. A meridian line running from the Ohio to Lake Erie, and dividing Ohio from Pennsylvania, is 93 miles long. The southern and south-eastern boundary is formed by the river Ohio, whose tortuous course along this line is stated to be 500 miles. Ohio comprehends nearly 40,000 square miles, or not much less than the kingdom of Portugal.

*Surface and Soil.*—The surface of this state may be divided into the Hilly and Prairie Region. The Hilly Region comprehends the eastern and southern districts, and may be considered as separated from the Prairie Region by a line commencing at the most north-eastern point of the state on Lake Erie, and running in a south-south-western direction to Zanesville on the river Muskingum; from this place it extends due west, and terminates on the boundary-line of Indiana near Eaton. Each region occupies about half the area of the state.

The *Hilly Region* contains some level and low land along the Ohio, but the level land does not extend more than one mile and a half from the bank of the river. It is very fertile, though in some parts swampy and subject to inundations. Behind this level tract the country rises suddenly into steep hills, called River Mountains, which vary in height, but in general range between 300 and 500 feet above the level of the river. From the summit of these hills the country extends in an uneven hilly plain furrowed by valleys; the hills are comparatively small, though very steep. Their summits form level plains of moderate extent. Rocks rarely appear on the surface, at least not to any great extent, though secondary limestone and sandstone prevail at a moderate depth below the surface. There are no precipices except along the numerous watercourses. The general

elevation of these uplands varies from 800 to 1000 feet above the sea-level. The inequalities of the surface do not render it unfit for cultivation. The bottoms along the principal rivers, which are frequently extensive, are exceedingly fertile, and produce very rich crops of grain. The declivities of the hills, when not too steep for cultivation, and the higher grounds between them, are less fertile, but by no means barren. The soil of both the bottoms and hills is almost uniformly an argillaceous loam: the soil of the valleys is very deep, and contains much lime and vegetable mould; the soil of the uplands is not so deep, though more so than is usually found in hilly regions. As the soil is light and unencumbered with stones, it is cultivated with ease. In its natural state the whole region is covered with trees. The uplands contain different kinds of oak, hickory, walnut, ash, poplar, dogwood, mulberry, sassafras, and some yellow pine. The levels along the Ohio and the other rivers are overgrown with button-wood, white pine, hemlock, butternut, the tulip-tree, locust, honey-locust, black alder, beech, elm, cedar, and cypress. The maple-tree is common all over the state.

The *Prairie Region* is an extensive and tolerably level plain. It contains no hills of any considerable magnitude, except numerous swells, some of which are extensive. Other parts contain large tracts of flat country, where scarcely an undulation of the surface can be discovered. The general elevation of this region hardly exceeds 1000 feet. This plain contains the watershed between the rivers which run southward to the Ohio and northward to Lake Erie. Near the north-eastern extremity of the state the watershed approaches the shore of Lake Erie within less than ten miles, but as it proceeds westward it retires about 20 or 25 miles from the lake, and continues at that distance, and nearly parallel to the southern shore of the lake, to 83° W. long., where it turns to the south of west and divides the upper branches of the Maumee and Miami rivers. No hills are visible along this line, and in many places the country is swampy. According to an exact survey, made for the purpose of constructing canals, the source of the Big Beaver River is 907 feet, that of the Muskingum 902, that of the Scioto 919, and that of the Miami 964 feet above the sea-level. These numbers show how small a difference in elevation exists along a line exceeding 200 miles in length. It is also remarkable that the elevation increases as we advance west from the Muskingum to the Miami river. But west of the last-mentioned river, where the watershed begins to run in a north-western direction, it declines again towards Lake Michigan. In the vicinity of this lake, the elevation of the watershed is only 700 feet, or about 130 feet above the surface of the lake. The tract in which these rivers originate is less elevated than the country which is south of it and extends to the banks of the Ohio river. The surface of this plain presents an alternate succession of woodlands and prairies. In the eastern districts the woodlands prevail. Near 83° W. long., or in the middle of the state, the surface is nearly equally divided between woodlands and prairies; but farther west the woodlands decrease in extent. The prairies are both wet and dry, but are all fit for cultivation. Along the south-western shores of Lake Erie there is an extensive tract covered with a deep swamp, called Black Swamp. A great part of the marshy and wet country is heavily wooded, especially with beech. The valleys by which this table-land is intersected, and in which the rivers flow, are less depressed below the surface of the plain than farther south, but they are broader and more regularly defined, being separated from the adjacent uplands by parallel ranges of bluffs, or mural banks. They are generally very fertile. Besides beech, which is most common on the swampy tracts, the forests of this region contain oak, ash, elm, hickory, sugar-maple, wild cherry, black walnut, poplar, and in some places cotton-wood and sycamore, most of which, especially the sycamore, attain a gigantic size.

*Rivers.*—The Ohio river runs along the eastern and southern boundary-line of Ohio. [MISSISSIPPI.] The other rivers which drain this country, though comparatively small, have recently acquired great importance, as affording the means of establishing a very extensive water communication in the interior of the state and between the countries bordering on Lake Erie and on both sides of the Ohio river. The most important of the rivers which fall into Lake Erie are the Maumee, the Sandusky, and the Cayahoga. The Maumee is formed by two branches, the St. Mary's and the

St. Joseph's rivers, of which the former rises in Ohio, and runs north-west, and the latter originates in the state of Michigan, and flows south-west. St. Mary's River is navigable from St. Mary's Fort downward during half the year for large boats carrying from 100 to 200 barrels of flour; during the rest of the year, in the dry season, there is scarcely water enough to float a canoe, and the course is much impeded by drift-wood. St. Joseph's River is stated to be navigable for 50 miles for boats. Both rivers unite after a course of about 70 or 80 miles at Fort Wayne, at a very acute angle, and then run east by north to Lake Erie, under the name of the Maumee. The Maumee runs about 160 miles, and during the spring has a free navigation for boats carrying 300 barrels of flour along the whole of its course. In the dry season the navigation is impeded by sand-bars. It empties itself into the western corner of Lake Erie by a wide mouth called Maumee Bay. The Sandusky river originates near 83° W. long, and 40° 45' N. lat., in two branches, which flow westward, and after their union turn northward. Towards its mouth it declines to the north-east, and falls into Sandusky Bay, a shallow sheet of water united to Lake Erie by a narrow strait. This river runs more than 100 miles, and is navigable for small boats during the early part of the year. The Cayahoga is the most important of the rivers which fall into Lake Erie, though its course does not exceed 80 miles. It rises west of 81° W. long., and in 41° 35' N. lat., about 10 miles from the shores of Lake Erie. It flows first in a western and south-western direction to 41° 8' N. lat., where it takes a north-north-western course to Lake Erie. In its natural state it was not navigable, but the waters are used to feed the Erie and Ohio canal.

The most important rivers which fall into the Ohio are the Big Beaver, Muskingum, Scioto, and Miami rivers. The Big Beaver rises east of the upper course of the Cayahoga river, and runs in an eastern and south-eastern direction for more than two-thirds of its course. In these parts it is not navigable on account of its great rapidity. After entering Pennsylvania, it receives from the north, near Newcastle, the Shenango river, and from this place downwards, a distance of 24 miles, is navigable for river barges. The Muskingum rises near 41° N. lat., south of the southern bend of the Cayahoga river, in two branches, of which the eastern is called Tuskawara and the western Chippewa Creek. By their union they form the Muskingum, which flows about 70 miles south, then nearly the same distance west, and lastly about 70 miles south-south-east. This river has much water, and is navigable for boats all the year for about 140 miles upward; when the waters are high, small vessels may ascend the Tuskawara Creek nearly to its source. Its waters are increased by many considerable affluents: at its mouth it is 541 feet above the sea-level. The Scioto river rises near 40° 30' N. lat., and flowing southward nearly through the middle of the state, falls into the Ohio after a course of about 250 miles. At its mouth it is 464 feet above the sea-level. It is navigable for large boats nearly 200 miles upward. The Miami originates not far from the source of the Scioto river, and runs in a general southern direction about 165 miles. It becomes navigable a few miles above Piqua for keel-boats, during half the year. At Piqua there is a considerable rapid, and a canal is cut to avoid it in ascending the river. In the dry season it ceases to be navigable at Dayton, about 80 miles from its mouth. The navigation is always rendered difficult by numerous sand-bars. At its mouth it is about 400 feet above the sea-level.

**Canals.**—The moderate elevation of the country between Lake Erie and the Ohio river, and its gentle slope towards both basins, suggested the idea of uniting them by a canal. It was found that the Ohio at the mouth of the Muskingum river was only 24 feet lower than the surface of Lake Erie, and the highest part of the intervening country, near the source of the Muskingum river, was only 337 feet above Lake Erie. A canal was accordingly made, which united the Muskingum and Scioto rivers. This canal, which was begun in 1825 and finished in 1832, and is called the Erie and Ohio Canal, is 324 miles in length, has 44 locks, and begins at Cleveland, where the Cayahoga falls into Lake Erie. It runs southwards along the Cayahoga river to its most southern bend, where it passes to the Tuskawara Creek over the highest level. It then follows the course of the Muskingum first south and then westward. Where this river bends again to the south, the canal continues westward and reaches the Scioto river, about 10 miles south of Columbus:

from this point it runs along the course of the last-mentioned river to its mouth near Portsmouth. It passes the towns or villages of Newark, Coshocton, Circleville, Chillicothe, and Piquet. There are several short branches from the main canal, one of which runs to Columbus, the capital, and is eleven miles long. Another canal has been made to remedy the difficult navigation of the Miami. It is 65 miles long, beginning at Dayton on the Miami, and extending along the course of the Miami to Hamilton, whence it runs southward to Cincinnati on the Ohio. A canal was begun some years ago which is to unite the Wabash river of Indiana with the Maumee. It is to be 211 miles long, of which 136 are in Indiana and 75 in Ohio. We do not know how far this work has advanced.

**Climate.**—In comparing the climate of Ohio with that of England, it appears that the climate of Ohio is colder in winter and warmer in summer. The mean annual temperature at Cincinnati on the Ohio, which is sheltered on the north by high hills, was found, after many years of careful observations, to be 53° 56', or about 3° 86' higher than that of London. The mean temperature of the winter at Cincinnati is 36°, at London 39° 3'; that of the spring at Cincinnati 63°, and at London 54° 1'; that of the summer at Cincinnati 72°, and at London 61° 2'; that of the autumn at Cincinnati 43°, and at London 44°. This shows, that the winters are somewhat colder in Cincinnati than in London. The cold is considered very great if the ground which is exposed to the sun's rays remains frozen during a month, though the mean temperature of January is more than two degrees below the freezing-point. The frost does not penetrate to the depth of more than five or six inches. Night-frosts occur in the beginning of May. Vegetation does not begin before the first week of March. In May and in June the heat increases rapidly, and the difference of the mean temperature of the spring in London and Cincinnati amounts to 9°. For about fourteen days in summer the thermometer rises to 90° and sometimes even to 98°. The autumn is colder than in London, and the first night-frosts occur at the end of September or beginning of October. The greatest decrease of heat takes place in October. Most of the rivers, including the Ohio, are covered with ice every winter. On the 14th of February, 1817, this river near Marietta was frozen to the depth of 19 inches. In 1797 the mercury sunk to 14°. The quantity of snow is small. In the valley of the Ohio it seldom exceeds four inches, but in the northern districts the quantity is much greater. The south-west wind prevails for nine months in the year, from March to November included. In December, January, and February the wind generally blows from the north-west. The greatest quantity of rain falls in April and May; the mean annual quantity is stated to be 36 inches.

**Productions.**—The wealth of Ohio consist in its agricultural productions: Indian corn, wheat, rye, oats, barley, and tobacco are extensively cultivated. Cotton arrives at maturity only in the districts along the Ohio river; and is liable to be injured by frost. Indigo was formerly cultivated to some extent, but the cultivation has been nearly abandoned. Most of the fruit-trees of England succeed well, and especially peaches. The wild grape grows luxuriantly on the southern side of the hills; and several vineyards have been planted, from which pretty good wine is obtained. The cultivation of the grasses is not neglected. Horned cattle and pigs are very abundant, and are driven in great numbers to the Atlantic states for sale, or sent down the Mississippi. Salt pork also constitutes an important article of exportation.

Bears and deer are still numerous in the forests, and the flesh of both is dried and cured for sale. The woods abound with wild turkeys, geese, ducks, pheasants, and partridges. The rivers, especially the Ohio, are well stocked with fish, and some of them attain a great size. Turtles are also found in them, and one kind is considered a great delicacy.

Iron-ore abounds, and is worked in a few places not far from the Ohio river. Bituminous coal exists in extensive strata along the Ohio and some of its confluent, but it is not yet extensively worked. Salt is obtained from springs on the Scioto river, and saltpetre and alum are found in several places.

**Inhabitants.**—The Indians, who in 1816 amounted to more than 3000 individuals, have lately abandoned the country, and settled chiefly to the west of the Mississippi river. The Wyandots still remain in Crawford coun-

on the upper course of the Sandusky river, between Columbus and Lake Erie. This tribe consists of less than 500 individuals; they cultivate some grain and keep cattle. The population, exclusive of the Indians, amounted, according to the census of 1830, to 937,903 individuals, of whom little more than 9000 were free coloured people, and the others were whites or descendants of Europeans. The great mass of the people is from the New England states. As no state in the Union has lately increased more rapidly in population, it is probable that by the census to be taken in this year (1840) it will not fall much short of 1,500,000 individuals. The population is not equally distributed over the surface of the country. The valley of the Ohio is not so populous as might be expected. Large tracts of it are but thinly settled, especially that which extends from the mouth of the Muskingum to that of the Scioto. The best settled districts are those of the hilly region which extends along the large rivers. The eastern districts of the prairie region, where the wooded tracts exceed the woodless plains, are nearly as populous. But nearly one-fourth of the state, or its north-western portion, is still thinly settled.

**Political Division and Towns.**—Ohio is divided into 75 counties. Columbus, the seat of government, is on the left bank of the Scioto river, very near the centre of the state; the population in 1835 was 4000; in 1812 the site of the town was covered with trees. It has little trade at present, and cannot rise to importance until the north-western portion of the state is better settled. The largest town is Cincinnati on the Ohio [CINCINNATI]; its population has not increased so rapidly since the opening of the Erie and Ohio Canal, because the produce of the eastern and better cultivated portion of the state goes now to Cleveland, and thence to New York or Montreal. Cleveland on Lake Erie, where the Erie and Ohio Canal begins, may be considered as the principal port of the state. The population in 1830 was 1076; in the beginning of 1835, one year and a half after the opening of the canal, it had increased to 4200 inhabitants, and it is now about 10,000. Steubenville, on the Ohio, contained about 3000 inhabitants in 1830, and has several manufacturing establishments. Zanesville, on the river Muskingum, a thriving place, had 3500 inhabitants in 1830, with some glass and vitriol manufactures and numerous flour-mills. Marietta, at the confluence of the Muskingum with the Ohio, is the oldest settlement of the state, being founded in 1788; it contained in 1830 about 1200 inhabitants. Portsmouth, at the mouth of the Scioto, and the termination of the Erie and Ohio Canal, is a thriving and populous place. Chillicothe, a well built town, in a very fertile tract on the river Scioto, has about 3000 inhabitants; Dayton, on the Miami, and at the beginning of the Miami Canal, has also about 3000 inhabitants. On the shores of Lake Erie is the small town of Huron, at the mouth of the river of the same name, which since 1833 has carried on some trade.

**Manufactures.**—Though this branch of industry cannot be expected to have made much progress in a country so lately settled, yet there are several manufactures of iron, wool, and cotton, although generally on a small scale. At Cincinnati and Cleveland many vessels are annually built, especially steam-boats. The manufacture of salt is of importance. In 1830, 446,350 bushels were made, chiefly at and near Lancaster, south-east of Columbus.

**Commerce.**—Until the opening of the Erie and Ohio Canal, nearly all the commerce of Ohio was concentrated in the town of Cincinnati, which was the only place from which the produce of the state was exported, and by which foreign goods entered it. But since 1830 a large portion of the articles designed for the foreign market go to Cleveland, and the supply of foreign goods comes through the same place. Its commerce has increased at an astonishing rate. In 1825 the number of vessels which entered the port was only 75, with a tonnage of 7310, and the value of the exports and imports was respectively 50,166 dollars and 132,645 dollars. In 1833 the total number of vessels, including steam-boats, was 1505, with 232,500 tons; the value of goods exported exceeded 2,000,000 dollars, and of goods imported 4,700,000 dollars. The distance of Cleveland from the city of New York by the line of the canals, Lake Erie, and the Hudson river, does not much exceed 650 miles, and from Montreal in Lower Canada it is even less, whilst the distance of Cincinnati from New Orleans by land is 560 miles, and by water considerably exceeds 1000 miles. Besides this, the navigation on the Ohio and Mis-

issippi is much more precarious and dangerous [MISSISSIPPI] than that on the canals, the Lake Erie, and the Hudson river, or on the St. Lawrence to Montreal. It is therefore probable that in a short time the greatest part of the produce of Ohio will find its way to Cleveland and thence to New York or Montreal, and from these places the state will be supplied with foreign goods. Cincinnati however will always be the commercial depot of the produce of the rich valley of the Miami river, and will continue a considerable place of trade. In 1833 its exports were valued at 5,000,000 dollars, of which pork amounted to 1,350,000. Some commerce is carried on with Baltimore by way of Wheeling in Virginia, and with Philadelphia by way of Pittsburgh, but it is not of great importance, on account of the heavy expense of the transport. The exports consist of live-stock, pork, bacon, beef, tallow, butter, whiskey, peach-brandy, ashes, soap, candles, some timber, and furs. The imports are manufactured goods from the United States and England, the produce of the West Indies, cotton, &c. and some articles of smaller importance.

**Antiquities.**—The remains of ancient fortifications, which are found in many places west of the Appalachian Mountains, are most numerous and extensive in the state of Ohio. They generally consist of circular embankments, walls, and mounds many feet high: they occur principally in the western districts of the state. West of Chillicothe is a wall of stone from 12 to 15 feet high and 4 or 5 feet thick, which encloses upwards of 100 acres. The ruins of this kind near Piqua are of still greater extent, and others occur near Cincinnati, Hamilton on the Miami, and other places. They are overgrown with trees as large as those of the surrounding forests, and hence it is supposed that they must have been erected at a very remote period. The Indians who, until lately, were in possession of the country in which they are situated, have no tradition respecting these fortifications, and hence it is conjectured that they were erected by a nation which has disappeared from the face of the earth.

**Education** has been much encouraged in Ohio. There are five colleges, the Ohio University at Athens [ATHENS], the Miami University, the Western Reserve College, Kenyon College, and Franklin College. There are a medical and a law school at Cincinnati. The New England system of common schools has been established. The chief religious sects are Presbyterians, Methodists, and Baptists.

**History and Constitution.**—This country was first visited by the French from Canada in the seventeenth century, by the route of the lakes Ontario and Erie, but no settlements were formed, until the British from Pennsylvania and Virginia began to occupy the country. The French tried to prevent this by establishing small forts from Presqu'île on Lake Erie to the Ohio along the channel of the Alleghany river. This however was considered by the British government as an encroachment, and it led to the war of 1755, by which the French lost Canada and were expelled from North America. Some settlements which were attempted after that time were destroyed by the Indian tribes then in possession of the country. Ohio was comprehended in the cession made by Virginia in the year 1787, after which the country, including the states of Michigan, Indiana, and Illinois, was formed into a territory. The first permanent settlement was formed at Marietta about 1788, but its progress, as well as that of some others farther west, was slow, until the Indians, in 1795, ceded a great portion of the state to the general government by the treaty of Greenville. The population now increased so rapidly, that in 1802 it attained the amount required for being constituted into a state. On the 29th November the present constitution was adopted, and in 1803 Ohio was admitted into the Union. The legislative body consists of a Senate and a House of Representatives, both elected by the white inhabitants who are twenty-one years of age and have resided in the state twelve months next preceding the election. The number of the House of Representatives is at present 72, and that of the senators 36: they are chosen annually. The number of the senators cannot be less than one-third nor more than one-half of that of the representatives. They are chosen biennially, and one-half of their seats are vacated every year. The supreme executive power is vested in a governor chosen for the term of two years by the same persons who elect the legislative body. Ohio sends two members to the Senate and 14 members to the House of Representatives at Washington.

(Darby's *View of the United States*; Pitkin's *Statistical View of the Commerce of the United States*; *American Almanac* for 1839.)

**ÖHLMÜLLER, DANIEL JOSEPH**, a German architect, who held the office of *Civilbau-inspector* at Munich, was born at Bamberg in 1791. After studying under Karl Fischer (died 1820), to whom many others were indebted for their professional education, he visited both Italy and Sicily, where he spent four years in examining the principal edifices, until he was summoned home in 1819, to superintend the erection of the Glyptotheca at Munich, after Klenze's designs. In 1831 he was commissioned to make designs in the Gothic style for a church in the Au suburb, and the first stone of the edifice was laid on the 28th November in that year. Taken altogether, this structure is one of the noblest and most successful works in that style which has been produced in modern times in Germany, and is remarkable for the splendour of its lofty windows, filled entirely with painted glass, one of which, whose subject is the Assumption of the Virgin, is represented in colours in Count Raczynski's 'Art Moderne.' This building alone would suffice for Oehlmüller's fame; but it was not the only one in which he had an opportunity of displaying his talents during his brief professional career, for he erected in the same style both the national monument at Wittelsbach and the Otto chapel at Kiefersfelden, the latter of which was begun in 1834, and the other completed in 1835. The church of St. Theresa at Hallbergmoos, begun by him in October, 1833, is in the Italian style. On the death of Domenico Quaglio (1837), he was employed to complete the works at the castle of Hohenschwangau. He did not however long survive his predecessor in that building, for he died at Munich, April 22, 1839.

**OIDE'MIA.** [FULIGULINÆ, vol. xi., p. 7.]

**OILS** are substances obtained from very different sources and under various circumstances. First, animal fats [FAT], though more or less solid, are to be regarded, both on account of their general properties and chemical constitution, as varieties of oil; there are also animal oils more properly so called, as whale and spermaceti oil. Secondly, there are the oils of vegetable origin, as those of olives and linseed, obtained by pressure, and called fat, fixed, or expressed oils, and those procured by distillation, termed volatile, essential, or ætherial oils. Thirdly, there are various oils produced by heat from animal, mineral, and other bodies, such as Dippel's oil, and naphtha; and lastly, there are certain oils produced by chemical action, as oil of wine, &c.

As it is not possible here to describe every variety of each kind of oil, we shall select some of the more important and better known cases for illustration, and we shall commence with an account of some of the

**Animal Oils.**—One of the best known and most extensively used of these is common whale or train oil, obtained by melting the blubber of the animal. As met with in commerce, it is of a brownish colour, rather viscid, and has a disagreeable fishy smell and taste. Its specific gravity is about 0·927. When exposed to the temperature of 32°, it deposits stearin, and the oil separated from the stearin by filtration is soluble in 0·82 of pure alcohol when heated to about 168° Fahr. Like other oils, it does not combine with water; it does not redden litmus paper, and is therefore devoid of acid properties. Whale oil is very readily converted into soap, requiring for this purpose 0·6 of its weight of hydrate of potash and 5 parts of water. The resulting compound is known in commerce by the name of soft soap; it is of a brown colour, and perfectly soluble in water. When it has been decomposed by tartaric acid, the acid liquor yields on distillation traces of a volatile fatty acid, which has been called *phocenic acid*. Like other oils, it is very combustible, and it is largely employed for the purpose of giving light by burning in situations in which its use is not precluded by its disagreeable smell. Its composition does not appear to have been exactly ascertained; but it probably is not very different from that of the oil next to be mentioned, which is the

**Spermaceti Oil**, obtained from an oily matter lodged in a bony cavity of the head of the *Physeter macrocephalus*, or spermaceti whale. When this substance is subjected to pressure in bags, a quantity of pure limpid oil is expressed; and the residue, after being melted, strained, and boiled with a weak solution of potash, is well known by the name of *spermaceti*. This oil is more pure and has a much less disagreeable smell than common whale oil, and it burns

much more brilliantly in lamps. According to Dr. Ure, spermaceti oil consists of—

Hydrogen	.	.	.	.	11·8C
Carbon	.	.	.	.	78·00
Oxygen	.	.	.	.	10·2C

100°

The *Vegetable Expressed Oils* vary in their general properties: most of them are fluid at usual temperatures; such as olive oil and linseed oil; and these possess but a slight degree of colour; whereas cocoa-nut oil and palm oil are at common temperatures soft butyaceous solids, and the last mentioned is of a reddish yellow colour. The first vegetable expressed oil which we shall describe is one which is well known and most extensively employed, viz.

**Olive Oil.**—[OLEA EUROPEÆ.]—The colour is yellowish, the odour and taste but slight. Its specific gravity is about 0·916, and consequently it floats on water, not being miscible with it. It congeals at about 36° Fahr., yielding small particles of stearin, which sink in the remaining fluid portion of oil; at 28° Fahr. it deposits 28 per cent. of stearin, the remainder being olein or elain. When heated to between 500° and 600° Fahr., it suffers decomposition; by exposure to the air it becomes rancid, especially when originally of inferior quality or adulterated with poppy oil. It dissolves in alcohol and æther, but in very small quantity. The more solid portion of vegetable oils is by some chemists called *margarin*, the term *stearin* being used only for the solid portion of animal oils.

This oil consists of olein and stearin or margarin, in the proportions of about 72 of the former and 28 of the latter. According to Saussure these are composed of—

	Olein.	Stearin.
Carbon	76·034	82·170
Hydrogen	11·545	11·232
Oxygen	12·068	6·302
Azote	0·353	0·296

100°

100°

The azote is so small in quantity, that if even actually present, it can scarcely be deemed more than accidental; and neglecting it, we shall find by calculation that taking the olein and stearin in the proportions stated, the ultimate analysis of olive oil will be nearly—

Carbon	.	.	78
Hydrogen	.	.	11·5
Oxygen	.	.	10·5

100°

**Linseed Oil** is expressed from the seeds of the common flax, *Linum usitatissimum*. When no heat is employed in the pressing, it is more viscid and has a greenish-yellow colour; it is then called in commerce *cold drawn* linseed oil. Its mean specific gravity is about 0·930. Its smell and taste are stronger and more disagreeable than those of olive oil. Linseed yields about 22 per cent. of oil; at -4° Fahr. it becomes paler coloured, but does not deposit any stearin on congealing, but at 5° lower it becomes a solid yellow mass; it has however been stated that when exposed for several days to a cold of 4° Fahr. it becomes solid. Linseed oil is soluble in 5 parts of alcohol when boiling, and 40 parts when cold; by æther it is much more readily taken up, 1·6 part dissolving 1 of the oil. When this oil has been long kept in a bottle partly filled, it becomes thick, and much more soluble in alcohol.

According to Saussure, linseed oil is composed of—

Carbon	.	.	76·014
Hydrogen	.	.	11·351
Oxygen	.	.	12·635

100°

When this oil is kept in a vessel imperfectly closed, in a cellar, a white fatty sediment and a brown powder are deposited. The former contains the stearin of the oil mixed with impurity insoluble in æther, which dissolves the stearin, and this crystallizes by the spontaneous evaporation of the æther. The stearin is soluble in 100 parts of cold alcohol, in 40 of boiling anhydrous alcohol, and 50 parts of cold and 20 of boiling æther; it is with great difficulty converted into soap. Linseed oil is largely employed in oil-painting and in varnish-making.

**Almond Oil** is another important fat oil, obtained, like the preceding, by pressure, and indifferently from sweet almond

or bitter. It is of a light yellowish colour, more fluid than olive or linseed oil; its odour and taste are very slight. Its specific gravity is about 0.917. When exposed to the air, it becomes colourless and rancid; it is soluble in 25 parts of cold and 6 of boiling alcohol, and ether dissolves it readily. According to Braconnot, when cooled to 15° it yields 24 parts of stearin, which melts at 43° Fahr., and 76 of olein, which does not solidify by exposure to the lowest temperatures; these statements have not however been confirmed by other chemists, and it has even been asserted that it contains no stearin whatever. This oil, according to Saussure, consists of—

Carbon	. .	77.403
Hydrogen	. .	11.481
Oxygen	. .	10.828
Azote	. .	.288

100.

It is employed sometimes in soap-making, and also in medicine.

**Castor Oil** is the expressed oil of the seeds of the *Ricinus communis*, a biennial plant, cultivated both in the old and new continent. When expressed without the assistance of heat, it is transparent and nearly colourless, or has only a slight yellowish tint; that which is quite colourless appears to have been rendered so by artificial means, and is much diminished in efficacy. It is very considerably viscid, and becomes solid when exposed to about 0° Fahr. Its specific gravity is about 0.960. It has scarcely any taste or smell. When exposed to the air it becomes thicker and rancid. It differs from most other fixed oils in being entirely miscible with alcohol and ether in all proportions, and it is employed only in medicine as a cathartic. By the action of heat and re-agents it is converted into numerous new compounds, which have been described by Bussy and Lecanu, in the 13th vol. of the 'Journal de Pharmacie.'

The analysis of Saussure gives as its composition,—

Carbon	. .	74.178
Hydrogen	. .	11.034
Oxygen	. .	14.788

100.

Having now stated the properties and composition of some of the best known and most useful of the *fluid* fixed oils, we shall briefly describe two which are *solid* at the usual temperature.

**Cocoa-Nut Oil.**—This oil is obtained by pressure from the kernels of the cocoa-nut, the fruit of the *Cocos nucifera*. It is white, has a slight pleasant smell, and its taste is rather agreeable; its consistence is about the same, or perhaps not quite so hard, as that of suet, and yet it contains some olein mixed with the stearin or margarin. Its specific gravity is about 0.910; it melts at 122° Fahr., and of late years it has been employed in soap-making; the stearin or margarin is also used advantageously as a substitute for wax in the manufacture of candles. It is remarkable for the little change which it undergoes by keeping; years are required to render it rancid.

**Palm Oil.**—This oil is of the consistence of butter, and of an orange-yellow colour; its smell is agreeable. It melts at about 103° Fahr. It becomes rancid very readily, and at the same time loses its colour. It is sparingly soluble in anhydrous alcohol, to which it imparts a yellow colour, whilst the solution in ether is of a red colour. It is stated to be composed of

Stearin or Margarin	. .	31
Olein	. .	69

100

We shall now mention the properties and composition of some of the *Volatile* or *Essential Oils*: these are fluid at the usual temperature, and with few exceptions are obtained by distillation. Essential oils are distinguished principally by the following properties from the expressed oils:—Usually they are more perfectly fluid, more combustible, have an aromatic or fragrant odour, and an acid taste; they are volatile *per se* without decomposition, and may be distilled with water at 212°, although their boiling-point is much higher. They combine with alcohol and ether in all proportions, but combine with water only in sufficient quantity to impart their odour to it. These oils evaporate without leaving any stain on paper, and they do not saponify with the alkalis.

In some instances, as those in which the volatile

oils exist in great abundance, they are obtained by pressure, without the application of heat; this is the case with the oil of lemons, oranges, and bergamot; in general however they are procurable only by distillation, and this is effected by putting the herb or bark into a still with water, when the oil and water are volatilized and condensed together. Like the fixed oils, they appear to contain a harder and a softer principle; the former has been called *stearopten*, the latter *eleopten*.

The first volatile oil we shall notice is one which is extensively employed, the

**Oil of Turpentine.**—To obtain this oil, turpentine, a well known viscid substance, which exudes from various species of the genus *Pinus*, is put into a still with water; the oil rises in vapour, and is condensed with the water, while *rosin*, as it is usually termed, remains behind. This, it has been stated, consists of two resins, to which the names of pink and silvic acid have been given by Unverdorben.

This oil when pure is limpid and colourless, and it possesses a peculiar, strong, and to most persons a disagreeable smell. Its specific gravity is about 0.865; the density of its vapour at 313°, compared with that of air, is 4.83 to 1. This oil is but slightly soluble in alcohol which contains water; 100 parts of alcohol, of 0.84 sp. gr., dissolve 13.5 parts at 72° Fahr. Like other essential oils, it is extremely inflammable, burns with much flame, and with the formation of water and carbonic acid, as is also the case with the fixed oils. Its boiling point is about 314°. It is composed of

Five equivalents of Carbon	. .	60 or 88.24
Four equivalents of Hydrogen	. .	4 or 11.76

64 100.

It is largely employed in the arts as a solvent in varnish-making and in house-painting.

Oil of turpentine dissolves the fixed oils and several other bodies with great facility. Thus iodine, camphor, and resins are soluble in it to a considerable extent. It is stated that it is capable of dissolving 163 times its volume of hydrochloric acid gas, provided it be kept cool; the resulting compound is a crystallized substance bearing considerable resemblance to camphor, and has been called *artificial camphor*. Great difference of opinion prevails among chemists as to the precise nature of oil of turpentine and the mode in which its elements are combined.

**Oil of Lemons**, commonly called *Essence of Lemon*, is one of the few essential oils obtained by pressure and not by distillation. It is extracted from the rind of the lemon, and is imported from the south of Europe. Its properties are, that it is limpid, and has a light yellow colour; it has an agreeable odour resembling that of lemons, and, like other essential oils, its taste is acid. Its specific gravity is about 0.847: it remains fluid even when cooled down to 4° Fahr. It dissolves in absolute alcohol in all proportions, but is less soluble in alcohol containing water.

According to Dumas it is composed of

Carbon	. .	88.45
Hydrogen	. .	11.46

99.91

It is therefore probably composed of exactly the same proportion of its elements as oil of turpentine, and, like this, it combines and forms a peculiar compound with hydrochloric acid gas. It is used in perfumery.

The two volatile oils now described may be taken as types of those which consist entirely of carbon and hydrogen, but the greater number of them contain oxygen also. Among these are the oils of lavender, peppermint, rosemary, spearmint, and marjoram; the properties of this last only we shall deem it requisite in this place particularly to notice.

**Oil of Marjoram.**—This oil is obtained from *Origanum vulgare*, and, according to Dr. Kane, has a specific gravity of 0.890: it generally contains a large but not a constant quantity of stearopten, and when purified from this by repeated distillation, Dr. Kane found its specific gravity to be 0.8673, and its boiling-point was 322° Fahr.

This yielded, by Dr. Kane's analysis, such proportions of its elements as showed that it was constituted of, according to his equivalent numbers,

Fifty equivalents of Carbon	307 or 86.48
Forty equivalents of Hydrogen	40 or 11.27
One equivalent of Oxygen	8 or 2.25

355 or 100.



The volatile oils which have been alluded to or described are all lighter than water, but there are some which are heavier than this fluid, and consequently sink in it; such are the oils of cinnamon, cloves, and cassia.

There are certain volatile oils which are poisonous, on account of the hydrocyanic acid which they contain: the most remarkable of these is the oil of bitter almonds; this however ceases to be poisonous when deprived of the hydrocyanic acid. Similar or analogous oils are obtained by distilling other substances with water, as laurel leaves, peach leaves, &c.

As an instance of an oil produced by the agency of heat upon animal matter, we shall briefly mention what has long been known by the name of Dippel's oil, from having been first obtained by a person of that name. When animal matter, such as the hoofs or horns of animals, is submitted to destructive distillation in retorts, there comes over with the other products an oily substance which has a very disagreeable odour and a dark colour; by repeated distillation the latter is got rid of, but the former remains, although the oil becomes light and limpid. It was formerly much used in medicine, but is not now employed.

The last example which we shall give is that of the formation of an oleaginous body by direct chemical action: it is the *Oleum Ethereum*, or Oil of Wine of the Pharmacopœia. When alcohol is distilled with twice its weight of sulphuric acid, an oleaginous compound is procured, which, after treatment with potash and exposure to the air, has the following properties: it is a yellow fluid, of a penetrating aromatic odour and a sharp bitter taste; its specific gravity is variously stated from 1.050 to 1.133, and there is some doubt whether its composition is not also variable, dependent upon the different quantities of a peculiar carburetted hydrogen which it is apt to contain.

According to Hennell, it contains

Sulphuric acid	38	or nearly one equivalent	40
Carbon	53.7	or nearly nine equivalents	54
Hydrogen	8.3	or nearly nine equivalents	9

100

103

The analysis of Serullas differs however considerably from this.

**OILS, VEGETABLE**, are divided by chemists into fixed and volatile, and the former into such as are drying, fatty, and solid. They may be considered with respect to the sources whence they are obtained, their abundance, and the probability of their being used as substitutes for the whale and sperm oils, which are becoming every day dearer from their comparative deficiency. Considerable prejudice is entertained against the employment of vegetable oils, in consequence, in some measure of their inferiority, and also because they are apt to undergo decomposition, but likewise because it is difficult to separate the other vegetable principles from the oil, and the chemical means adopted for their purification render some still more impure as oils. But that many of these are very valuable is evident from several being imported in large quantities from the countries where they are produced, and hence forming important articles of commerce. In many countries they are solely employed for all the purposes for which animal oil is alone thought applicable in England. The high price of the latter has however induced dealers to mix with them a portion of the despised oils of the vegetable kingdom. This subject appears interesting and sufficiently important to induce chemists to ascertain the properties of each kind of vegetable oil, as fitted either for burning in lamps for soap or candle making, and their numbers are sufficiently great to render it highly probable that some will be found eligible for all these purposes. Many are noticed under the heads of the plants which yield them, as the cocoa-nut, palm, olive, and croton oils. Linseed and hempseed are both imported in large quantities from the north of Europe, and the former, of late years, also from India, whence also sesamum or *til* seed is also largely imported, as well as from Egypt. Oil, both volatile and fixed, is very extensively diffused through vegetables; the former in almost every part of a plant except the cotyledons of the seed, and the latter in the seeds chiefly, but also in their fleshy covering, as in the olive, some palms, the fruit of Melia, and others. Some families of plants abound especially in this principle, and therefore several species yield it, as among the Cruciferae we have mustard, rape, and colza seed oil, with other species especially cultivated in Europe, India, and Japan, of which some have of

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late years been imported into this country. Several of the family of Compositæ secrete oil in quantities large enough to render it desirable to cultivate them for this purpose alone, as the sunflower and Jerusalem artichoke, also some species of Carthamus or bastard saffron, and also the *Verbesina sativa* of India, now known to be identical with the Abyssinian *Guizotia oleifera*, and of which the oil is known in commerce by the name of Hutsyellow oil. So *Madia sativa* yields Madi oil, and its seeds are said to be more abundant in oil than any plant introduced into Europe. Most of the Cucurbitacæ also, as the melon, gourd, cucumber, and the numerous varieties, cultivated especially in India, contain a large proportion of oil, which is expressed in the East, as it formerly was in Europe. The Rosacæ also store up a large proportion of oil in the kernels of their fruit, as in the almond, which is particularly valued; so also that of the apricot, as well as that of the Briançon apricot, and other species of Prunus. In the Himalayas, oil is also expressed from the apricot kernel, and has been sent to this country, of a fine quality.

Among the *Amentacæ* we have also several species which yield oil of good quality, and in sufficient quantity to repay the expense of expression, as nut oil, obtained from the hazel; beech-nut oil, from *Fagus sylvatica*; with these may be mentioned walnut oil, from *Juglans regia*. Besides these, poppy oil, Ben-nut oil (*Hyperanthera*), ground-nut oil (*Arachis*), physic-nut oil (*Jatropha*), are well known. So the cotton-seed yields oil, which is also the case with the seeds of the tea-plant, especially of the species called *Thea oleifera*, and some of the Camellias.

In the article **BASSIA** it has been mentioned that two species, *B. longifolia* and *B. latifolia*, both yield oil; another species, *B. butyracea*, yields a vegetable butter, and is commonly known as the Ghee, or butter-tree of Almora. The native name of this tree is *choonee*, and Mr. Traill describes it as not being found in Kemaon, but in the adjoining Goorkhal province of Dotee. Of this an analysis has been given by Mr. E. Solly, in the 'Proceedings of the Royal Asiatic Society.' He describes it as being solid at ordinary temperatures, and that at about 120° Fahr. it is perfectly melted, and appears then as a pale yellow oil. He found a specimen of the Phoolwa, as the butter is called, which was brought to this country five years ago by Mr. Traill, to consist of sixty parts of solid oil, thirty-four of fluid oil, and six parts of vegetable impurities. The whole is readily soluble in warm alcohol, and might therefore be employed for liniments. It makes excellent soap, and burns with a bright flame, without smoke or smell, and would therefore, Mr. S. conceives, be superior in some respects to the piney tallow. In the above Proceedings of the Committee of the Asiatic Society for 1839, there are notices of several other vegetable oils sent by the Bombay Chamber of Commerce for analysis and examination by practical men as to their useful properties. The other solid oils are much better known, and may be referred to the articles Cocos, Croton Oil, PALM OIL, LAUREL, MYRISTICA, and CACAO.

**OISE**, a river in France belonging to the system of the Seine. [SEINE.]

**OISE**, a department in France, bounded on the north by the department of Somme; on the east by that of Aisne; on the south by those of Seine et Marne and Seine et Oise; and on the west by those of Eure and Seine Inférieure. Its form approximates to that of a parallelogram, having its northern and southern sides of 60 and 65 miles respectively, and its eastern and western sides of 42 and 38 miles. It is included between 49° 3' and 49° 46' N. lat. and 1° 40' and 3° 8' E. long. The area of the department is estimated at 2256 square miles, being a little below the average area of the French departments, and rather larger than the conjoint areas of the adjacent English counties of Derby and Stafford. The population, in 1831, was 397,725; in 1836 it was 398,641; showing an increase of 916, or less than one-quarter per cent. in five years, and giving about 177 inhabitants to a square mile, being above the average of the French departments, both in amount and density of population, but far inferior in both respects to the English counties with which we have compared it. Beauvais, the capital, is on the river Terrein, a feeder of the Oise, 39 miles in a direct line north by west of Paris, or 41 miles by the road through St. Denis and Beaumont-sur-Oise.

This department has no mountains nor any lofty hills: the surface consists of gentle undulations. The highest ground extends across the department from east to west

not very far within the northern boundary, and separates the basin of the Seine from that of the Somme. That part of the department which is comprehended in the former basin is by far the larger, and is watered by the Oise and its tributaries. The Oise enters the department near the north-eastern angle between Chauny and Noyon, and flows in a tolerably direct line of 55 miles south-west through the department, passing Noyon, Compiègne, Pont-Sainte-Maixence, and Creil, between which last town and Beaumont it quits this department to enter the adjacent one of Seine et Oise. It is navigable throughout that part of its course which is in this department. The Aisne, which is also navigable, enters the department on the east side, and has a tolerably direct course of 12 miles west by north into the Oise above Compiègne. Below the junction of the Aisne the Oise receives the Bresches, or Brèche, and the Terrein, or Therain, on the right bank and the Autone; or Authonne, the Nonette, and the Thève, on the left. These are all small: the Terrein, the longest of them, has a course of about 45 miles south-east; neither of them is navigable. The Ourcq, a feeder of the Marne, just crosses the south-eastern angle of the department, and is navigable for a few miles; and the Epte, a feeder of the Seine, forms in one part the western boundary. Some of the feeders of the Somme have their sources within the northern boundary of the department, but they are all unimportant.

The official statement of the inland navigation of the department is as follows:—Oise, 65 miles; Aisne, 13; Ourcq, 6 miles: total river navigation, 84 miles. Canal parallel to the Oise, 17 miles; Canal of the Ourcq, 5 miles: total of canal and river navigation, 106 miles.

There are several pools and marshes.

The greater part of the department is occupied by the chalk formation which surrounds the Paris basin: the southern part is occupied by the strata of the supracretaceous group. There are no metallic ores; but marble, free-stone for building, some of it of superior quality, sandstone for paving, millstones, gypsum, lignite (the ashes of which are used for manure), and potters' earth, are dug. Fossil remains are abundant; and round Beauvais above 1100 persons are employed in digging peat. There are several mineral springs, for the most part chalybeate, but none of much repute. There was, in 1834, only one iron-work in the department, having two forges for the production of wrought-iron.

The department is traversed by twelve Routes Royales, or government roads, having an aggregate length of 365 miles, namely, 341 in good repair, 12 out of repair, and 12 unfinished. The principal road is that which leads from Paris through Beauvais and Marseille to Abbeville and Calais. The road from Paris to Peronne and Cambrai passes through Senlis and Pont-Sainte-Maixence; that from Paris to Amiens passes through Chantilly, Creil, Clermont, St. Just-en-Chaussée, and Breteuil; that from Paris to Laon crosses the south-eastern angle; and that from Paris to Dieppe crosses the south-western angle of the department. Roads lead from Beauvais to Clermont and Compiègne, to Breteuil, and to Gournay (Seine Inférieure); from Senlis, along the valley of the Oise, by Compiègne and Noyon, to La Fère and St. Quentin (Aisne), with a branch from Noyon to Ham (Somme); and from Compiègne, on the one hand, to Montdidier and Amiens, and on the other, to Soissons. The Routes Departementales, or departmental roads, have an aggregate length of 311 miles, namely, 246 in repair, 11 out of repair, and 54 unfinished. The bye-roads and paths have an aggregate length of more than 3000 miles. (*Official Returns*, 1st January, 1837.)

The air is temperate, and for the most part healthy: the exceptions are the neighbourhood of the various pools and marshes. The soil varies in fertility: more than 950,000 acres, constituting about two-thirds of the department, are under the plough. The produce in corn is very great, being nearly as much again as the average produce of the French departments. In wheat, which is the grain chiefly cultivated, the preponderance is yet greater, and in rye and maslin (or mixed corn), and in oats, the growth of which is all but equal to that of wheat, greater still. Barley and potatoes are cultivated, but not very extensively. Some hemp and pulse are grown: maize and buckwheat are not grown at all. Wheat and oats are exported in considerable quantity, principally to Paris and Rouen. The quantity of grass-land is about 70,000 acres; and there are 35,000 to 40,000 acres of heath or other open grazing-land. The arti-

ficial grasses most cultivated are trefoil and lucerne. There are only about 6000 acres of vineyards, and the wine grown is, with little exception, of very inferior quality. The wines of Bourgogne and Champagne are chiefly consumed. Orchards and gardens occupy about 35,000 to 40,000 acres: a considerable quantity of cider is made. The woodlands comprehend about 200,000 acres. The principal forests are those of Compiègne (about 35,000 acres), Chantilly, Ermenonville, and Le Lys.

The number of horses in the department is nearly double the average number in the other departments; they are for the most part brought from the department of Pas de Calais, where they are bred. The number of neat cattle is not equal to the average of France. The calves reared in the department furnish the markets of Paris with some of their most delicate veal. The number of sheep is great, and the produce of wool considerable: the breed has been much improved by crossing with the English (Leicester and South-down) and Merino breeds. A portion of the wool is employed by the manufacturers of Beauvais and the valley of the Oise. A considerable quantity of pork and poultry is fattened for the supply of Paris, and bees are commonly kept. The larger game, stags, roes, and wild boars, are found in the woods, and the rivers abound with fish.

The department is divided into four arrondissements, as follows:—

		Sq. M.	Population.		Com-munes.
			1831.	1836.	
Beauvais	W.	749	131,385	132,369	234
Clermont	N.	501	89,448	89,837	161
Compiègne	N.E.	494	97,812	97,645	156
Senlis	S. & S.E.	512	79,080	78,790	132
		<hr/> 2256	<hr/> 397,725	<hr/> 398,641	<hr/> 683

The number of cantons, or districts, each under a justice of the peace, is thirty-five.

The arrondissement of Beauvais includes the towns of Beauvais (pop. in 1831, 12,867; in 1836, 13,082) [BEAUVAIS], Gerberoy, and Songeons, on the Terrein; Marseille and Milly, on the Petit Terrein; Grandvillers, or Grandvilliers (pop. 1811), Formerie, La Bosse, Chaumont, and Meru. Gerberoy is on an eminence. It is now an insignificant place, but was antiently a frontier fortress toward the duchy of Normandie, and was exposed to frequent assaults. It suffered much in the wars of the English in France, and in the religious wars of the sixteenth century. The fortifications of the town, which had been dismantled, were subsequently restored. It is surrounded with pleasant walks, and the townsmen carry on some trade in horses and cattle. It has two yearly fairs. Songeons is pleasantly situated at the foot of a hill, and consists of well-built brick houses. Spectacles and looking-glasses are manufactured, and trade is carried on in iron goods and other hardwares, coal, corn, cider, and cattle. It has four yearly fairs. Marseille is well built of brick and in a pleasant situation. The townsmen manufacture leather, and trade in cattle: there are five yearly fairs. At the village of Achy, in the neighbourhood of Marseille, yarn is spun of wool, camels' hair, and silk. Grandvillers is on the road from Paris to Abbeville: it has wide streets converging in a large market-place: the inhabitants manufacture woollen cloth, serge, hosiery, toys, and soap. Hosiery and serge are also made in the neighbourhood, and the town is the centre of a considerable trade in these articles, and in corn, brandy, cider, coal, cattle, and horses. In the neighbourhood are two castles, that of Damerancourt, a strong fortress of the feudal ages, and that of Sarcus, built early in the sixteenth century, in a rich style of architecture. Chaumont is built on the slope of a hill, the summit of which is crowned by the parish church. Woollen cloths, lace, leather, and fans are made; there are water-mills and lime-kilns; and trade is carried on in corn, hay, wood, and woollen goods. The population of the commune is about 1800. Meru is the centre of a considerable manufacture of horn, mother-of-pearl, bone, ivory, hard wood, and other toys: nearly fifty men were employed a few years since in making fans alone. At the neighbouring village of St. Gèneviève, two hundred workmen are employed in finishing these toys. Agricultural implements, snuff, leather, and lace are also made; and trade is carried on in corn, cattle, horses, and wool. In and around Auneuil, a village between Beauvais and Chaumont, eight hundred females are employed in lace-making; and in and about

the village of Nivillers, near Beauvais, about the same number are engaged in spinning hemp, in combing and spinning wool, and weaving stockings. At the village of Hanvoile, near Songeons, a great quantity of serge is made; and at Savignies and La Chapelle-aux-pots, near Beauvais, are extensive potteries.

In the arrondissement of Clermont are—Clermont (pop. in 1831, 2594 town; 2715 whole commune; in 1836, 3235 commune) and Bulles, on the Bresches or Brèche; St. Just en Chaussée, near the head of the Arre, a small tributary of the Bresches; Mouy (pop. 1817 town, 2372 commune) on the Terrein; Breteuil (pop. 2244 town, 2284 whole commune) on the Noye, a feeder of the Somme; and Crévecœur. Clermont, distinguished from other places of the same name as Clermont-Oise or Clermont en Beauvais, was at first probably a border castle erected as a barrier against the Normans. In the tenth century it became the capital of a county, which, in the thirteenth century, was conferred by St. Louis on his son Robert, ancestor of the house of Bourbon. The town is pleasantly situated on the slope of a hill, the summit of which commands an extensive and beautiful prospect, and is crowned by an antient castle. At the foot of the castle wall is an agreeable public walk. The principal manufactures of the town are cotton yarn, printed and other calicos, and linens; there are bleaching grounds, brewhouses, tanneries, and saltpetre refineries; and trade is carried on in corn, cattle, horses, flax, and linens. The surrounding country is remarkable for the growth of cherries. Clermont has a large monthly corn-market and fifteen yearly fairs. Bulles has a population of about 1000: the townsmen spin flax and manufacture fine linens. There are oil-presses. St. Just en Chaussée was formerly a walled town and of greater extent than at present; it is about as populous as Bulles. The townsmen manufacture hosiery, and trade in cattle and wooden wares. Mouy is the centre of a considerable woollen manufacture, which employs in the town and neighbourhood about 1200 workmen. The washing of the wool and the dyeing and finishing of the cloth are carried on in the town. There is a good weekly market, also a yearly fair. Breteuil has probably risen from the decay of a Gaulish town (the Bratuspantium of Cæsar, *Bell. Gal.*, lib. ii., c. 13), the traces of which, called by the people around Brantuspante, have remained till the present time. A number of vases, coins or medals, and other antiquities have been dug up. The townsmen make shoes for the troops and for the hospitals of Paris; worsted stockings, serge, shawls, and other woollen goods; paper, earthenware, and leather; they trade in corn, cattle, and cider. There are good nursery-grounds round the town. Crévecœur has an antient castle built of brick, with a walled park and gardens. The inhabitants, who exceed 2000, are engaged in the manufacture of woollen stuffs; and trade in corn, trefoil and lucerne seed, cattle, and horses.

In the arrondissement of Compiègne are—Compiègne (pop. in 1831, 8879; in 1836, 8895) [COMPIÈGNE] and Noyon (pop. 5535 town, 5946 whole commune), on or near the Oise; and Pier-fond, about 7 miles south-east of Compiègne. Noyon is mentioned in the 'Itinerary' of Antoninus and the 'Notitia Imperii' under the name of Noviomagus. In the fifth century the bishop's see was transferred hither from Augusta Veromanduorum, now St. Quentin. Pepin le Bref began and Charlemagne (who was crowned here) finished the erection of the cathedral; and at Noyon, Hugues Capet was elected king. It was taken by the League, A.D. 1593, and retaken the next year by Henri IV. The town is well laid out and well built, at the foot and on the slope of a hill, and is traversed by the two branches of the little river Vorse, which flows into the Oise a short distance from the town. It has four gates, which take their names from the four suburbs, and several fountains. The cathedral is a large building, about 340 feet long, with two towers of the height of 200 feet. There are an antient episcopal palace, a seminary for the priesthood, an hospital, and pleasant public walks. The bishop's see no longer exists. The townsmen manufacture linens, muslins, hosiery, and leather; and trade in corn, hosiery, hides, and vegetable ashes. Pier-fond or Pierre-font had a strong castle, which was obstinately defended by the leaguers against the troops of Henri IV. It was dismantled by Louis XIII., and now forms one of the most picturesque ruins in the country.

In the arrondissement of Senlis are—Senlis (pop. in 1831, 5066; in 1836, 5016) [SEN LIS] and Nanteuil-le-Hardouin, on the Nonette; Pont-Sainte-Maxence (pop. 2453 town, and

2575 whole commune) and Creil, on the Oise; Merlou or Mello on the Terrein; Chambly, on the brook Méru, which flows into the Oise; Crespy or Crépy (pop. 2242 town), and Ancy or Assy. Nanteuil has the ruins of an antient castle, the residence of François and Henri, the celebrated dukes of Guise, and of an antient Cluniac priory. The townsmen (about 1300 or 1400 in number) carry on some manufactures, and trade in corn and cattle. Pont-Sainte-Maxence or Maixence is in a pleasant situation, and is remarkable for a handsome bridge of three arches, erected in 1777, in the place of a more antient one supposed to have been built by the Romans. Each corner of this bridge is adorned with an obelisk, and the piers are composed each of four columns arranged two on each side, with an interval of 9 or 10 feet between them. The inhabitants are engaged in tanning leather, and they trade in corn (a considerable quantity of which is sent to Paris), wine, and cattle. It has a good weekly market, and a fair every month. In the neighbourhood are the ruins of the antient and rich abbey of Moncel. Creil is pleasantly situated. On an island in the Oise are some remains of an antient castle built by Charles V., and of an antient abbey. The town was pillaged by the Huguenots in 1567, and subsequently taken by the League. The principal manufacture of the place (which has a population of about 1500) is of earthenware, porcelain, pottery, and glass, which gives employment in and about the town to 900 workmen. Some printed cottons are manufactured, and trade is carried on in coal, corn, flour, and cattle. In the district round the town manufactures are carried on; and there are several stone quarries, where the workmen live in habitations excavated in the rock. Merlou or Mello has an antient castle on a picturesque and commanding eminence, at the foot of which lies the little well-built town, of 400 or 500 inhabitants, who weave cachemire shawls, merinos, calicos, and laces. Turf is dug in the neighbourhood, and some trade in cattle is carried on. Chambly has about three times the population of Merlou; the streets are wide and well laid out; and the houses well built; there is a pleasant public walk. The inhabitants make laces, braid, and blond lace; and there are tile-works and several flour-mills. Some trade in flour is carried on. Crépy or Crespy was the capital of the county (afterwards duchy) of Valois, and in the feudal ages was a place of great strength. In 1431 it was taken by the English, who are said to have destroyed fifteen hundred houses. The strong castle of the counts of Valois was also taken and destroyed. The town was retaken by the French in 1533. In 1544 a treaty was concluded at Crépy between François I. and the emperor Charles V. In 1588 the town was taken by the League and retaken by Henri IV. It is surrounded by a public walk planted with trees, and is entered by five gates. The columns of the choir of the parish church are remarkable for their lightness and beauty. Part of the walls of the town and of the old castle are standing. The manufactures are lace, cotton goods, leather, and, in the environs, home-spun linen; trade is carried on in corn, wood, cattle, horses, thread, and woven goods. There are two yearly fairs. In this arrondissement are the villages of Chantilly, where were the magnificent park and palace of the princes of Condé, destroyed in a great part during the Revolution; and of Ermenonville, where Rousseau died (A.D. 1778) and was buried. His tomb remains, but the body was removed to Paris, A.D. 1794.

The population of the towns, when given accurately, is, unless otherwise stated, from the census of 1831, and is that of the whole commune; when only an approximation is given, the authority is Dulaure's *Histoire des Environs de Paris*, Paris, 1825-28.

The manufacture of toys is carried on in the villages between Meru and Beauvais; that of optical glasses and mirrors around Songeons; bricks, tiles, crucibles, sugar-refiners' pots, and other pottery, between Beauvais and Songeons and around Songeons; cotton yarn at various places in the arrondissement of Beauvais. In the district round Creil manufactures and establishments of various kinds are carried on with great activity; porcelain, earthenware, glass, woollen, linen, and cotton yarn, and goods, lace (at Chantilly), silk and cotton buttons, brass and iron wire, and paper are made; stereotype and other printing, bleaching, card-making, sheet-copper and iron works, and flour-mills are in active operation. The industry of this district owes much to the duke of La Rochefoucauld. The morality of the humbler classes has been improved by the



introduction and progress of manufactures, and by the attention of the capitalists engaged in them. The principal manufactures of the arrondissement of Compiègne are of cotton. The extension and improvement of the manufactures of the department are owing to the industry and skill of persons from other parts rather than to the inhabitants.

The department constitutes the diocese of Beauvais, and is in the jurisdiction of the Cour Royale and the circuit of the Académie Universitaire of Amiens. It is in the first military division, the head-quarters of which are at Paris. It sends five members to the Chamber of Deputies. In respect of education it is above the average of France; of the young men enrolled in the military census of 1828-29, more than half (54 in every 100) could read and wrote.

In the most antient period of the history of France, this department was chiefly comprehended in the territory of the Bellovaci; portions of it were included in the territories of the Silvanectes, the Vadicasses, the Suessiones, the Veromandui, the Ambiani, and the Velocasses, all of them Belgic nations, and all afterwards included in the Roman division of Belgica Secunda, except the Velocasses, who were included in Lugdunensis Secunda. Of Gallic and Roman towns and stations the chief within its limits were Cæsaromagus, afterwards Bellovaci, Beauvais; Bratuspantium, near Breteuil; Litanobriga, Pont-Sainte-Maixence, or more probably Creil; all in the territory of the Bellovaci; Noviomagus, Noyon, in the country of the Veromandui; Augustomagus, afterwards Silvanectes, Senlis, in the territory of the Silvanectes; and Næomagus, probably Vez, a village near the Authonne, in the territory of the Vadicasses. There are the traces of a Roman camp between Beauvais and Clermont.

Before the Revolution the department was included in the districts of L'Île de France proper, Valois, Noyonnais, and Soissonnais, in the military government of L'Île de France, and in the districts of Santerre and Amienais in Picardie.

OKA, River. [RUSSIA.]

OKHOTSK, a commercial town, situated on the northern shores of a wide gulf of the Pacific Ocean, which separates the peninsula of Kamtchatka from the continent. It is in 59° 20' N. lat. and 145° 18' E. long. The town was formerly built on a flat sandy neck of land, about two miles in width, and washed on one side by the river Ochota, and on the other by the sea. But as its low situation rendered the place extremely unhealthy on account of the fogs in which it was frequently enveloped, and also exposed it to inundations during southern and south-eastern gales, the town was removed a few years ago about three miles farther up the river. It is now built on a low hill rising about thirteen feet above high-water mark, on the right bank of the Ochota. The town is small, consisting only of a few hundred houses, and the inhabitants are estimated not to exceed 2000. But as it is the only place by which the intercourse between the interior of Siberia on one side and the peninsula of Kamtchatka and the Russian dominions in North America is maintained, it has a considerable commerce, though, owing to the sterility of the adjacent country, it has no article of exportation except a small quantity of furs. The Russian American Company, whose wealthy partners reside in the town of Irkutsk, build vessels here from time to time, but at a great expense, as the timber must be brought down from the woods, which are more than fifty miles distant. The furs brought from America are landed here, and transported by land through Yakutsk to Irkutsk, and thence to Kiachta, to be exchanged for articles of Chinese production. The harbour is very bad. It is formed by the river Ochota, which, meeting the sea by a rapid course, has formed at its mouth a sand-bar, with only nine feet of water on it. Besides this, it is only accessible from June to September, being blocked up with ice and snow the remainder of the year. The Russian government has accordingly resolved to select another place on the coast of the Bay of Okhotsk, which offers a better harbour, and to build there a new town. According to the most recent information, the mouth of the river Uda (54° N. lat. and 136° E. long.) offers considerable advantages, having a fine harbour sheltered by the Shantar Islands.

(Sauer's *Account of Billing's Geographical and Astronomical Expedition to the Northern Parts of Russia*; Langsdorf's *Voyages and Travels in various Parts of the World*; Saryschef's *Voyages of Discovery to Siberia, &c.*; Erman's *Reise um die Erde durch Nord Asien und die beiden Oceane*.)

O'KHRIDA, a town of Albania, in European Turkey, situated on the north-eastern shore of a considerable lake, which takes its name from the town. According to the map of Albania prefixed to Hughes's 'Travels' (2nd edit., 1830), Okhrida is in 41° 3' N. lat. and 21° 5' E. long.

Okhrida is on or near the site of the antient Lychnidus (Λυχνιδος, or perhaps Λύχνιδος, Strabo). This town of Lychnidus gave antiently its name to the lake which was called ἡ λίμνη Λύχνιτις or Λυχνιδία. The town lies at the foot of an eminence, the summit of which is crowned by a castle, in which the Turkish governor of the surrounding province resides. The population of the town is estimated at about 6000, chiefly of Bulgarian descent. Silver ore and sulphur are procured from mines near the town. A Greek archbishop resides here.

The lake of Okhrida extends about 18 miles from south-east to north-west, and is 6 or 8 miles across in the widest part. It is in the valley watered by the Black Drin, which flows through the lake in the direction of its length. There are several villages round the shore. It abounds with fish; and the fishery is actively carried on.

The pashalick or district of Okhrida is not very large, but in the uncertain state of Turkish geography we do not attempt to define its boundaries or dimensions. The district is mountainous, and is said to be well wooded; it is watered by the Black Drin and the Seombi. It is tolerably productive in corn, maize, rice, tobacco, cotton, hemp, fruit, and wine. Cattle and bees are reared, and game is tolerably abundant. The inhabitants are distinguished by their courage and ferocity, and are reputed to make the best soldiers among the Albanians.

OLACA'CEÆ. This name applies to a small and little studied natural order of Exogenous plants, chiefly found within the tropics. Its most important characters are a small inferior calyx, often becoming enlarged around the ripe fruit, a polypetalous valvate corolla, a small number of hypogynous stamens, partly fertile and partly barren, a one-celled ovary, with pendulous ovules, indehiscent fruit, and a small embryo amongst a large quantity of albumen. Its affinities are little understood, but are supposed to be greatest with Pittosporaceæ, on the one hand, and Aurantiaceæ, on the other. The plants are of little importance for useful qualities; one species, *Heisteria coccinea*, yields, it is said, the partridge-wood of cabinet-makers, and the fruit of others is eatable when ripe, though not very pleasant. (Lindley's *Natural System of Botany*, ed. 2, p. 33.)

OLA'US, MAGNUS, a native of Sweden, and brother to John Olaus, archbishop of Upsala, was an archdeacon in the Swedish church when the Reformation, supported by Gustavus Vasa, gained the ascendancy in Sweden. In consequence of this change the two brothers, who remained attached to the Roman Catholic faith, left their country and retired to Rome, where Olaus Magnus passed the remainder of his life in the enjoyment of a small pension from the pope. At Rome he wrote his work, '*Historia de Gentibus Septentrionalibus, earumque diversis Statibus, Conditionibus, Moribus, itidemque Superstitionibus, Disciplinis, &c.*' Rome, fol., 1555, and Basil, 1567. Other editions of this work have been published, which, as well as a French translation in 1561, are all incomplete. The work is minute, and contains some curious information, but is uncritically written. Olaus died at Rome in 1568. His brother John wrote a work entitled '*Gothorum Suevorumque Historia, probatissimis Antiquorum Monumentis collecta*,' Rome, fol., 1554, which is a still more uncritical performance than that of his brother Magnus.

OLD RED-SANDSTONE. By this title English geologists have almost universally designated the variable series of rocks which separate the youngest slates ('Transition Rocks') from the mountain-limestone and coal. Messrs. Conybeare and Phillips (*Geology of England and Wales*) ranked the old red-sandstone in their 'Medial Order' along with the coal and mountain-limestone; and this classification has been unreservedly followed till within a short period. Mr. Murchison, in his work on the 'Silurian System,' has preferred to separate the old red-sandstone from the superincumbent strata, and to constitute for it an additional system. Since the publication of that work, the same author, in conjunction with Professor Sedgwick, believing that the limestones and slaty and conglomerate rocks of South Devon belong to the same geological period as the true old red-sandstone of Herefordshire, and desirous

of improving the nomenclature, has proposed for these variable strata the title of the Devonian System. If the evidence of the correspondence of geological age, between the calcareous and slaty strata of South Devon and the red-sandstones of Herefordshire, should become strong enough to command the assent of geologists, the settlement of an appropriate name will not be without difficulty, especially if we remember that the continental types of stratification ought to be included in a good general appellation.

Confining ourselves then to the characters of this *formation, or system*, where they are most conspicuous, viz. in the districts of Monmouthshire, Breconshire, and Herefordshire, and the borders of the Cumbrian, Lammermuir, and Grampian mountains, we find in the old red-sandstone the following kinds of rocks:—

**Conglomerates.**—These are usually composed of a basis of red-sandstone, or red argillaceous matter, in which multitudes of large and small pebbles are imbedded. The fragments thus enclosed are usually such as may be supposed to have been derived from the neighbouring slaty rocks of older date, and they are often collected in great abundance in the lower parts of actual valleys. This is observed especially near Kirkby Lonsdale, Sedbergh, and the foot of Ullswater. Among the fragments of grauwacke, quartz pebbles occur, sometimes containing micaceous iron-ore and other products of mineral veins. The conglomerate rocks of Herefordshire, Monmouthshire, &c. contain little else than fragments of quartz, making what is called a plum-pudding-stone.

**Sandstones.**—In most situations these are laminated parallel to the stratification, and in Monmouthshire, Herefordshire, &c. they have interspersed mica, and yield very good flagstone.

**Argillaceous Beds.**—These abound in the English and Welsh series, and by their red, white, and greenish colours, often exhibited in alternate bands and spots, resemble very nearly some varieties of the upper or new red-sandstone series.

**Calcareous Beds.**—The limestones of this series of rocks are usually associated with the argillaceous strata, and are very peculiar in character. They lie somewhat irregularly interstratified with the clays, and partake of the same colours, reddish, whitish, greenish, the different lines being so mixed in spots as to give the stone the aspect of a breccia, or conglomerate, and to justify its local name of 'gooseberry stone.' It is in places a nearly pure carbonate of lime in massive beds, but it is very seldom employed for any useful purpose. We have seen polished fragments which might be mistaken for variegated marble.

The best general series of these rocks known is that unfolded by Mr. Murchison's examination of the country along the border of South Wales. That author presents us with the following three groups in a descending order:—

1. Quartzose conglomerate and sandstone. The conglomerates occupy a thickness of about 200 feet, and then pass down into chocolate-brown sandstones, mottled marls, &c.

2. Cornstone formation, including marly clays and the peculiar limestone above described. Fragments of fossil fishes, especially of the *Cephalaspides*, occur not uncommonly.

3. Tilestone. Nearest in position to the Silurian rocks, these laminated sandstones resemble them somewhat both in organic remains and mineral aspect, being however more arenaceous and micaceous, and, except in particular lines, less productive of fossils. On the surface they make a red soil, while the upper Silurians yield a grey soil.

Mr. Murchison estimates the total thickness of the old red-sandstone system at not less than 9000 or 10,000 feet. (*Silurian System*, p. 184.)

OLDCASTLE, SIR JOHN, called 'the good,' the first martyr and the first author among the nobility of England, was born in the fourteenth century, in the reign of Edward III. He married the heiress of Lord Cobham, by whom he obtained that title. He gained military distinction in the French wars under Henry IV. and V., and was a domestic and a favoured attendant of the latter. Lord Cobham was a man of extensive talents, qualified for the cabinet or the field, of ready wit in conversation, and of great learning. He examined the writings of Wickliffe as a philosopher, and in the course of his study became a convert to the doctrines of that reformer. He collected and transcribed the works of Wickliffe, maintained preachers of that persuasion, and became a leader of the reformers. Lord Cobham being

summoned to appear before the archbishop of Canterbury, refused, was excommunicated, and sent to the Tower, from which he escaped into Wales. The clergy got up a report of a pretended conspiracy of the Lollards, headed by Lord Cobham, whereon a bill of attainder was passed against him, a price of 1000 marks set upon his head, and exemption from taxes was promised to any person who should secure him. At the expiration of four years he was taken, and without much form of trial executed in the most barbarous manner; he was hung in chains on a gallows in St. Giles's Fields, London, and a fire kindled under him, by which he was roasted to death, in December, 1417. He wrote 'Twelve Conclusions addressed to the Parliament of England;' he also edited the works of Wickliffe, and was the author of several religious tracts and discourses.

**OLDENBURG, or HOLSTEIN-OLDENBURG**, a grand-duchy in the north of Germany, consists of three distinct portions. 1. The Duchy of Oldenburg, properly so called, which lies between 52° 54' and 53° 44' N. lat. and 7° 40' and 8° 45' E. long., contains 2090 square miles: it is bounded on the north by the German Ocean; on the east by the Hanoverian province of Bremen, the territory of the city of Bremen, and the Hanoverian province of Hoya; on the south by Osnabrück; and on the west by the Hanoverian province of Meppen and East Friesland. 2. The Principality of Lübeck, which is surrounded by the duchy of Holstein, contains 180 square miles. One large portion is compact and unbroken; the remainder is scattered on the banks of the Schwartau and the Trave. 3. The Principality of Birkenfeld, which is on the left side of the Rhine, contains 170 square miles; it is bounded on the north-west and south by the Prussian province of the Lower Rhine, on the north-east by Mesenheim, and on the south-east by the principality of Lichtenberg. The area of the whole is 2440 square miles.

**Surface of the Country; Soil; Climate.**—The Duchy of Oldenburg Proper is a part of the great plain of Northern Germany, without mountains or hills, and without forests. Heaths and moors alternate with cultivated spots, in such a manner that the latter, as Hassel observes, are like oases in the desert. The coasts are low, and protected against the inroads of the sea, partly by dunes, and partly by dykes, like those in Holland. The mouths of the Weser and the Juhde are lined with dykes. The soil of the interior of the country is poor, but there is rich marsh land on the banks of the Weser and at the mouth of the Juhde. The principal rivers are the Weser (which however only forms the boundary between Oldenburg and the province of Bremen), the Juhde, which forms a large bay where it falls into the German Ocean, the Hunte, the Hase, and the Leda. There are no large lakes; the most considerable, the Zwischenahner Meer, is 6 miles in circumference, and its banks are surrounded by picturesque well-wooded eminences. The climate, like that of Northern Germany, is damp and subject to frequent fogs; yet on the whole it is not unhealthy. The natural productions are corn of all kinds, flax, hemp, some hops, culinary vegetables, timber for building, and wood for fuel. There are the usual domestic animals, especially very good horses, nearly equal to those of East Friesland, poultry, game, fish, and bees. There are no metals; but there is indifferent turf, pipe and brick clay, and quarry stone. The Principality of Lübeck is flat and resembles Oldenburg in its soil and climate, but it contains some beautiful lakes, especially those of Plön and Eutin. The Schwartau and the Trave are the chief rivers. The Principality of Birkenfeld lies on the side of the mountain-range called the Hochwald, branches of which traverse it, and contain small valleys between them. The soil is in general sterile. The climate is rather cold near the mountains and on the eminences, but in the valleys it is mild and healthy. The natural productions are corn, flax, hemp, timber, fruit, and wine. The mineral kingdom affords lead, iron, coals, slate, agate, jasper, chalcedony, and lapis lazuli.

**Trade and Commerce.**—The chief occupations of the inhabitants are agriculture and the breeding of cattle. The farmers on the moors and marshes follow each a different system of cultivation; yet none of these systems can be called good. There is scarcely such a thing as a village, the farm houses lying quite isolated in the centre of the farms. There are no great manufactures in the grand-duchy, but the people make considerable quantities of coarse linen, worsted stockings, and thread, which, though in general the work of the leisure hours of the country-people, are a source of

great profit. Oldenburg is extremely well situated for commerce, but the trade is chiefly a coasting trade, which is carried on in vessels with one or two masts, from twenty to forty tons burden, calculated for navigating the shallow waters (called Watten) between the sand-banks in the German Ocean, on the coasts of North Holland, Groningen, Friesland, and Germany, to the river Eider. The exports are the natural productions of the country, including 6000 horses and from 8000 to 10,000 oxen annually, and considerable quantities of linen, leather, raw hides, rags, &c., principally to Holland and the Hanseatic cities. The revenue is about 150,000*l.* sterling, and there is no public debt. Of the inhabitants, 246,772 are Low Germans and 980 Jews. The established religion is the Lutheran; there were, in 1837, 173,598 Lutherans, 70,880 Roman Catholics, 2314 Calvinists, and 980 Jews.

*Education.*—With respect to education, Oldenburg is rather backward. The rarity of villages renders it difficult to establish schools. There is no university, and till lately no great public library or scientific institutions. Much has however been done of late years. The various branches of a learned education are now taught in the Protestant gymnasium at Oldenburg, the Roman Catholic gymnasium at Vechta, the Latin schools at Jever and Eutin. There are likewise a normal school, a military school, a seminary for school-masters, and 2 superior Burgher schools.

*Government, &c.*—As a member of the German confederation, in conjunction with Anhalt and Schwarzburg, Oldenburg has the fifteenth place, or vote, in the select council of the Diet, and one vote of its own in the full council. The contingent to the army of the Confederation is 2177 men. Since 1834 Oldenburg furnishes the contingent of artillery for the Hanseatic cities, which in return furnish the contingent of cavalry for Oldenburg. The constitution is monarchical, and hitherto without an assembly of estates. The government is hereditary in the male line.

*History.*—The ancient house of Oldenburg is one of the most illustrious in Europe: the emperor of Russia, the kings of Denmark, and the late royal family of Sweden are descended from it. Oldenburg is the original seat of the family. Christian I. founded the town of Oldenburg in 1155, and assumed the title of count. One of his descendants, Dietrich the Fortunate, obtained with his first wife the county of Delmenhorst, and with his second the duchies of Schleswig and Holstein. After Dietrich's death in 1440, his eldest son, who had for his share Schleswig and Holstein, became in 1448 king of Denmark, by the title of Christian II., in 1450 king of Norway, and in 1458 king of Sweden. He left two sons, John, who succeeded him in the northern kingdoms, and Frederic I., who had Schleswig and Holstein, and who, after the deposition of his nephew Christian II., the son of John, was made king of Denmark and Norway. His eldest son Christian III. inherited in 1513 the two kingdoms, and Adolphus, the younger, founded the house of Holstein-Gottorp, which has given sovereigns to Sweden, Russia, and Oldenburg. Dietrich's younger son Gerard the Warlike inherited Oldenburg and Delmenhorst, but the male line of this branch becoming extinct in 1667, the counties fell to the Danish crown, or to the house of Holstein, descended from Dietrich's eldest son. In 1773 the grand-duke Paul of Russia, who was descended from the elder branch of the house of Holstein-Gottorp, made a convention with Denmark respecting his share of Holstein, by which he surrendered all Holstein to Denmark, and received in exchange Oldenburg and Delmenhorst, which he immediately transferred to his cousin Frederic Augustus, of the younger branch of Holstein-Gottorp. This convention was sanctioned by the emperor Joseph II., who gave to the two counties the rank of a duchy, and as the house of Holstein-Gottorp had ever since 1647 given bishops to the see of Lübeck, he assigned it to that family as an hereditary principality. Frederic, the first duke, was succeeded in 1785 by his son Peter Frederic William, but he being afflicted with mental imbecility, the government was assumed by his cousin Peter Frederic Ludwig, the bishop of Lübeck, who in 1808 joined the Rhenish confederation. But Napoleon, by a decree of 14 December, 1810, incorporated the duchy with the French empire, and offered the duke as an indemnity the territory of Erfurt, which he refused, saying, 'I desire only subjects whom I know and love, and who love me.' After the fall of Napoleon, the duke recovered his own dominions; the congress of Vienna also assigned to him the prin-

cipality of Birkenfeld; he obtained from Russia the lordship of Jever, and likewise obtained the sovereignty over the lordships of Varel and Kniphausen, which belong to Cour Bentinck.

OLDENBURG, the capital, in 53° 20' N. lat. and 8° 11' E. long., is a well built town on the navigable river Hunte; the ramparts have been converted into public walks and gardens. The population is 7800, including that of the two suburbs. The palace is a very handsome building with a fine park, or what the Germans call an English garden. There are some tanneries, distilleries, and saw-manufactories in the town. The public institutions are—the gymnasium, the seminary for schoolmasters, the military school, a library of 45,000 volumes, an observatory, and a remarkable collection of antiquities chiefly of Oldenburg.

*Varel*, on a canal which joins the Jahde, forms a harbour which merchantmen can enter at high-water, has 3000 inhabitants. *Jever*, in a fertile country on a navigable canal, has a good trade and 3600 inhabitants. *Eutin*, which is the only town in the principality of Lübeck, is on the bank of a lake, has a palace of the grand-duke with a beautiful park, and 2700 inhabitants.

(Halem, *Geschichte des Grossherzogthums Oldenburg*, 3 vols., 1794-1796; Trundes, *Kurzgefasste Oldenburger Chronik*, 1831; Köhls, *Beschreibung des Herzogthums Oldenburg*, &c., 2 vols., 1824.)

OLDENBURG, HENRY, was born about the year 1626, in the duchy of Bremen. In 1653, or before, he came to London in the capacity of consul from the town of Bremen, but he does not appear to have held this office more than two years. In 1656 he became tutor to Lord Henry O'Bryan, a young Irish nobleman, whom he accompanied to the university of Oxford, and at the same time entered himself as a student, chiefly, it is supposed, in order to obtain access to the Bodleian library. He was afterwards tutor to Lord William Cavendish. While resident at Oxford he became acquainted with several of the more eminent literary and scientific men of the time, among whom were Dr. Wallis, Ward, and the other originators of the present Royal Society. His acquaintance with Milton commenced somewhat earlier, as appears by Milton's letters to Oldenburg, between the years 1654-59, published in his 'Epistolæ Familiares.' In 1662 the Royal Society having obtained a charter of incorporation, Dr. Wilkins and Mr. Oldenburg were appointed secretaries to the Society. According to most biographers the nominal appointment of Oldenburg was that of assistant secretary to Dr. Wilkins, but in the list of members who attended the first council held by the Society after its incorporation (Thomson's *Hist. of Royal Society*), we observe only one secretary specified, namely Oldenburg, and it is certain that those duties which demanded the greatest zeal and assiduity devolved exclusively upon him. Dr. Martin Lister, in his 'Journey to Paris,' 8vo., Lond., 1699, speaking of Oldenburg, remarks, 'I heard him say that he held correspondence with seventy odd persons in all parts of the world; I ask him what method he used to answer so great variety of subjects, and such a quantity of letters as he must receive weekly, for I knew he never failed, because I had the honour of his correspondence for ten or twelve years. He told me he made one letter answer another, and that to be always fresh, he never read a letter before he had pen, ink, and paper ready, to answer it forthwith, so that the multitude of his letters cloy'd him not, or ever lay upon his hands.' In the 'General Dictionary,' Lond., 1739, fol., art., 'Oldenburg' there will be found several of his letters to Mr. Robert Boyle, who was one of his regular correspondents, and with whom he was always on the most friendly terms. The following extract from one of those letters, dated 17 December, 1667, shows that up to that time he had received no salary from the Society, and that his only emoluments were derived from the publication of their Transactions. 'I have some grounds to believe,' he remarks, 'that there are persons who think the Transactions bring me in a sufficient revenue; but I will make it out to any man that I ever received more than 40*l.* a year upon this account (and that is little more than my house rent), and now by a new agreement I have been obliged to make, I shall not bring it to above 36*l.* a year at most. How strangely therefore I must needs shift for my subsistence, and with what distraction I must perform my tedious work, let any sober man judge.' The following year Dr. Ward, then bishop of Salisbury, suggested to the council of the Society the propriety of

ing some allowance to their secretary, observing that his own part he was ashamed that Oldenburg should have been permitted to devote so much time and pains to business of the Society without any consideration. The result of the application does not appear. The Transactions published by Oldenburg extend from No. 1, dated March 1664, to No. 136, dated June 25, 1677, the year preceding his death. In 1675 he was accused by Hooke of not doing justice to him on the subject of the invention of spiral springs for pocket-watches. The dispute which ended was at length terminated by a declaration of the Council, 'that the publisher of the Transactions had carried himself faithfully and honestly in the managing of the ingenuity of the Royal Society, and had given no cause for reflections.'

Oldenburg married the daughter of the famous John Dryden, with whom he received an estate in Kent valued at £100 a year. His only child was Rupert, named after his grandfather Prince Rupert. He died, according to most authorities, in 1678 (Thomson says September, 1677) at Charlton, between Greenwich and Woolwich, where his body was interred.

He is author of a few short papers upon medical and other subjects in the 'Philosophical Transactions,' and also some 'twenty tracts, chiefly theological and political, in which he principally aimed at reconciling differences and promoting peace and unanimity.' (Hutton.) He published, under the name of 'Grubendol' (an anagrammatised form of his real name), English translations of—1, 'Prodromus a dissertation by Nich. Steno, concerning solids naturally obtained within solids,' 1671, 8vo.; 2, 'A genuine explication of the Book of Revelations, full of sundry new Christian Considerations,' 3, 'The Life of the Duchess of Lorraine,' from the French. It is also stated that he translated several of Mr. Boyle's works into Latin.

The letters of Oldenburg, dated in 1667, leave no doubt that during some part of that year he was confined to the tower upon political grounds.

**OLDHAM**, a parliamentary borough and manufacturing town in the parish of Oldham-cum-Prestwick, in the Middleton division of the hundred of Salford and county palatine of Lancaster. Its direct distance from London is 165 miles north-west; from Lancaster 43 miles south-east; and from Manchester six miles north-east. The town is situated on an eminence on the western bank of the Medlock and near the source of another stream called the Irk. The rapid rise of this town is mainly attributable to its being in the vicinity of extensive coal-mines, which give employment to a large portion of its population, and to the great increase of cotton manufactures since the middle of the last century. In 1760 it is said to have consisted of only sixty dwellings: in 1801 its population was 12,024, and in 1831 it was 32,381. The number of steam-engines employed in the manufacture of fustians, cotton, and woollen and silk goods, has been roughly estimated at eighty, which is probably under the truth. The making of hats is supposed to be carried on here upon a larger scale than in any other part of England, and it was in this particular branch of manufacture that Mr. Thomas Henshaw, the principal benefactor of the town, realised his great wealth. Fairs for the sale of cattle, horses, sheep, and pedlery are held by custom on the 2nd May, 8th July, and the first Wednesday after 12th October.

In 1827 an act of parliament (7th and 8th Geo. IV., c. 64) was obtained for improving the road between Oldham and Standedge and for effecting other improvements in the town itself. Since then a local police has been established, and gas and water works erected. About the same time the old church of St. Mary, some portions of which are believed to have been erected in the reign of King Stephen, was taken down, and upon its site was laid the foundation of a new one, which, Mr. Baines observes, was by mistake dedicated to St. Paul instead of St. Mary. The living is a perpetual curacy, in the diocese of Chester and patronage of the rector of Prestwick. Its annual net income is 191*l*. The parliamentary borough is co-extensive with the chapelry of Oldham, comprising the townships of Chadderton, Crompton, and Royton, in addition to the township of Oldham. Oldham was first constituted a borough by the Reform Act, and now returns two members. In 1832 the Sunday-schools within the chapelry were thirty-eight in number and afforded instruction to more than 8000 children of both sexes. What is called the free grammar-

school was founded by James Assheton, or Ashton, in the year 1606, but the income appears to have never exceeded its present value, which is about 26*l*. It 1826 it afforded partial instruction to fourteen boys free of charge. A much more important foundation is that of Thomas Henshaw, above mentioned, who, in 1807, after making sundry bequests, the chief of which was an annuity of 300*l*. a year to his widow during life, directed that the sum of 20,000*l*. should be applied out of his estate in supporting a blind asylum to be afterwards established at Manchester, and that 40,000*l*., together with the residue of his estate, should be appropriated to instituting and supporting a blue-coat school either at Manchester or Oldham, as the trustees might deem advisable; but he further directed that no part of these sums should be expended in the purchase of ground or in the erection of buildings, not doubting that either public or private benevolence would supply both the one and the other. The testator died in 1810, and fifteen years elapsed before his confidence in the benevolence of others was shown to be well grounded. In the meantime a bill was filed in the Court of Chancery, praying that the bequests in favour of the Blue-Coat School and Blind Asylum might be declared void, and the widow and next of kin declared entitled to the residue of the estate. The prayer having been refused, the property was vested in the name of the accountant-general, and had in February, 1826, accumulated to 96,320*l*. 6*s*., three per cent. consols, inclusive of 11,000*l*. stock for securing the annuity to the widow, &c., which stock at the death of the annuitants will go in augmentation of the funds of the school. The blind asylum has been recently opened at Manchester. [MANCHESTER, xiv., p. 374, wherein read 'Henshaw,' instead of 'Kershaw.'] The ground for the blue-coat school was given in 1825 by Messrs. Radcliffe and Jones, and is situated on the lower part of Oldham Edge. The cost of erecting the school was principally defrayed by a subscription among the inhabitants of Oldham amounting to between 5000*l*. and 6000*l*., and the building itself was completed in 1833-4 under the direction of Mr. Lane. It is a handsome stone edifice of considerable length, ornamented with several pinnacles, and comprising among its numerous apartments a spacious lofty school-room, dining-rooms, and an elegant entrance-hall.

Since 1834 two other schools have been established at Oldham with the assistance of grants from the lords of the Treasury, made at the recommendation of the National and British and Foreign School Societies. One of these can accommodate 1200 and the other 500 children.

(*History of the County Palatine of Lancaster*, by Edward Baines, 4to., London, 1836, in 4 vols.; *Sixteenth Report of the Commissioners on Charities*, 1826-7, ix., p. 222; *Return of Grants for the Advancement of Education*, 1837-8. xxxviii., &c.)

**OLDYS, WILLIAM**, an industrious and accurate bibliographer, and a useful biographical writer, was born in the year 1687. He was the natural son of Dr. Oldys, chancellor of Lincoln and advocate of the Admiralty Court. His father left him some property, but he seems to have fallen into extravagant and intemperate habits, and soon dissipated it. He was for some time librarian to the earl of Oxford, and made the catalogue of that nobleman's collection of books and MSS. when it was prepared for sale by Osborne the bookseller. The Duke of Norfolk appointed him to the situation of Norroy king-at-arms. He died on the 15th of April, 1761, aged seventy-four. His dissolute habits continued through life, and he died poor.

He was the author of the following works:—'The British Librarian, exhibiting a compendious view of all unpublished and valuable Books in all Sciences, as well in MS. as in Print,' London, 1737, 8vo.: anonymous. This work, though long neglected, is now esteemed for its accuracy and usefulness. A 'Life of Sir Walter Raleigh,' prefixed to Raleigh's 'History of the World,' 1738, folio. A translation of Camden's 'Britannia,' 2 vols. 4to., has been ascribed to him, almost with certainty. 'The Harleian Miscellany, or a Collection of scarce, curious, and entertaining Pamphlets and Tracts,' London, 1753, 8 vols. 4to. He wrote in the 'Biographia Britannica' the lives distinguished by the signature G, among which are those of T. and E. Allyn, Eugene Aram, Cuxton, Sir Geo. Etherege, &c. Besides the above works, he published a few others on bibliographical and medical subjects; and several manuscript notes on subjects of bibliography, together with a copy of

Langbaine's Lives, filled with remarks, are preserved in the British Museum.

O'LEA EUROPÆA, differs from most trees, except the sweet bay (*Laurus nobilis*), some species of cornus, and a very few others, in yielding a fixed oil from the pericarp; the seed being the source of fixed oils in most plants. The oil which is expressed from the ripe fruit immediately after being collected is most esteemed, and called virgin oil, *oleum provinciale*. That which is most highly prized comes from Nice and Genoa. When the oil is extracted by a stronger pressure, or by the aid of heat, or after the olives, having been collected into heaps, have remained till a kind of fermentation has occurred, it is the common olive oil, the properties of which vary in proportion as the fermentation has been of long or short duration. An oil of still inferior quality is obtained, when the husk of the olive, after the former treatment, is boiled in water. This kind is employed solely for the preparation of soap.

Virgin oil is of a very pale yellow or yellowish-green colour, more limpid when fine than any other fixed oil; inodorous; when fresh, but emitting a very peculiar odour when old; taste purely oily but by age becoming slightly rancid. Common olive-oil is o. a deep greenish or brownish-yellow colour, and an odour and taste more or less subrancid. Its specific gravity is greater than the other.

Olive-oil, on account of its high price, is frequently adulterated with poppy or rape oil. The former may be easily detected, if present in the proportion of only one per cent., as it retards the solidification of the oil, when a mixture, consisting of nine parts of nitric and three parts of hypophosphorous acid, is added to a hundred parts of the suspected oil. The presence of metals may be detected by sulphuretted hydrogen. For various means of applying these and other tests, see Thomson's *Organic Chemistry*, 'Vegetable Substances,' p. 435.)

Olive-oil is used in medicine as an emollient, and to form cerates and plasters. It is also used in the manufacture of soap. The finest kind is much employed with various articles of food, particularly in the countries where it is produced.

As this oil becomes viscid more slowly than any other vegetable oil, it is used, after being purified, by watch-makers.

OLEA'CEÆ, so named after the subject of the last article, are monopetalous Exogenous plants, with a superior 2-celled ovary, a subvalvate corolla, two stamens, and a fruit with pendulous albuminous seeds. In the artificial collocations of natural orders to be found in books, these plants are usually stationed next *Jasminacæ*, with which they have been even combined. It is however probable that they have really as much affinity with some of the monopetalous dicarpous orders.



*Olea Europæa.*

1. A flower; 2, an ovary divided vertically; 3, a ripe fruit cut in half; 4, a stone divided longitudinally.

The species of the order best known in this country are, the Olive, or *Olea Europæa*, the Lilac, or *Syringa vulgaris*,

the Evergreen Phillyrea of many forms, the Privet, or *Ligustrum*, and the Fringe-tree, or *Chionanthus*; all which respond in habit and in sensible properties, which latter are very generally bitter and febrifugal. The bark of the Olive has been extensively used by the French instead of Quina, and the young fruits of the common lilac form an infusion scarcely inferior to gentian.

The most anomalous genus of the order is the Ash, which in its most genuine form, has no petals, and in the divaricate called *Ornus* has the petals present, but separate to the base. It is however, in all essential circumstances, these in structure as the more regular genera; and its relation to the order has been ingeniously proved by the fact that the Olive and the Lilac will both live when grafted upon it. It is from the *Ornus*, or Flowering Ash, that the bitter sweet purgative substance called manna is secreted.

OLEARIUS, ADAM, whose name was OELSCHLAGER, was born about the year 1600, in the country of Anhalt. He studied at Leipzig, and made considerable progress in mathematics and philology. Frederic, duke of Holstein-Gottorp, having resolved to send an embassy to Russia for the purpose of opening a commercial intercourse through that country with Persia and India, appointed Crasius, a civilian, and Brugman, a merchant, as envoys, and named Olearius secretary to the embassy. The envoys left Holstein in October, 1633, and arrived at Moscow in August, 1634, where they were well received by the czar Michael Fedorowicz, who was related to Duke Frederic. The czar gave them permission to proceed to Persia by the Volga and the Caspian Sea, and encouraged them in their undertaking. They however returned to Gottorp in April, 1635, in order to make further preparations for the journey. In the month of October of the same year the embassy set off again, arrived at Moscow in March, 1636, and thence descended by various rivers to the Volga, and down that stream to Astrakhan, where they arrived in September. From Astrakhan they sailed into the Caspian Sea, but were wrecked off Derbent; and in December they pursued their journey by land, passing through Ardebil, Sultanieh, Casbin, and Koom. In August, 1637, they reached Ispahan, then the capital of the Persian kingdom. After spending several months at Ispahan, the two envoys, with Olearius, retraced their steps to Derbent, and thence by land to Astrakhan, passing through the desert of Lesghistan, and in January, 1639, they entered Moscow for the third time. On the following August they returned to Gottorp. In consequence of this mission the shah of Persia sent an envoy to the duke of Holstein. Olearius published a narrative of his journey, 'Muscowitische und Persische Reisebeschreibung,' fol., Schleswig, 1647, with plates. It was translated into French by Wicquefort, 4to., 1656, and both the original and the translation went through several editions. The work was also translated into Dutch, Utrecht, 1651; and into English, 'Voyages and Travels of the Ambassadors sent by Frederic, Duke of Holstein, to the Great Duke of Muscovy and the King of Persia; with John A. de Mandelslo's Travels from Persia into the East Indies,' translated by J. Davis, fol., London, 1662.

Olearius was a judicious observer and a conscientious but rather diffuse writer. His account of the state of Russia two centuries ago is extremely curious, as well as the information which he gives concerning Persia. He agrees with other modern travellers in describing the Persians as a very corrupt people, and as more debased than the Turks, though at the same time more refined in external behaviour. The then reigning sovereign of Persia, Saïf Mirza, called also Shah Seïf, grandson of Shah Abbas, he describes as a monster of cruelty and lust. Olearius also speaks very frankly of the conduct of some of the members of the embassy, especially the envoy Brugman, who behaved in a very improper and intemperate manner on several occasions. (b. iv.)

Olearius also published the narrative of Mandelslo's travels to India, which is annexed to the later editions of the travels of Olearius, as well as to the English translation above mentioned. Mandelslo was a young German nobleman who accompanied the embassy to Ispahan, from whence he proceeded to India by Ormuz and Surat. From Surat he went to Agra, where he saw Sultan Kurram, called also Shah Jehan, the then sovereign of the Mogul empire. Returning to Surat, he embarked for Goa, where he remained some time: he then proceeded by sea to Ceylon, from whence he sailed again for Europe, where he arrived at the end of 1639. Besides describing the places which he



actually visited, Mandelslo communicated much information which he obtained at Ceylon concerning the Indo-Chinese countries, the empires of China and Japan, and the Philippines, the Moluccas, and Java.

Olearius, after his return, was made councillor and librarian to the duke of Holstein. He died in 1671. He wrote also a chronicle of Holstein, 4to., Schleswig, 1674.

OLEFIANT GAS. [HYDROGEN.]

OLE'GGIO. [NOVARA, Province.]

OLEIC ACID. Several processes have been proposed for the preparation of this acid, which is formed during the action of linseed and some other oils upon potash, and the formation of soap. To procure this acid a solution of the potash soap is to be mixed with a large quantity of water; by this supermargarate of potash is precipitated, and this is to be separated by the filter; the filtered liquor is to be concentrated by evaporation, and the free potash saturated with hydrochloric acid, and water again added precipitates a further portion of the supermargarate of potash: these operations are to be repeated as long as the pearly supermargarate is precipitated by water. After this the clear liquor is to be evaporated and decomposed by a slight excess of hydrochloric acid, which decomposes the oleate of potash, and separates the oleic acid.

The properties of oleic acid, when purified from margaric acid and a little colouring matter, are, that it is a colourless oil; its smell and taste are somewhat rancid; its specific gravity, at 65° Fahr. is 0.898. When cooled a few degrees below 32°, it concretes into a mass of needleform crystals. In vacuo it distils without alteration, but when in contact with air a portion suffers decomposition. It is insoluble in water, but mixes in all proportions with alcohol of specific gravity 0.822, and water precipitates it from the alcohol, which furnishes the best method of freeing it from colouring matter. It reddens litmus, and when heated decomposes the alkaline carbonates.

Oleic acid cannot however be obtained in a separate state, being always in combination with either water or base; 100 parts contain 3.8 of water. The anhydrous acid consists, according to the opinion and atomic numbers of Berzelius, of

70 atoms . . . carbon	81.32
117 " . . . hydrogen	11.09
5 " . . . oxygen	7.59

—100

It follows from what has been stated of the mode in which oleic acid is procured, that it enters largely into the composition of soaps, forming with potash soft soap, and with soda hard soap.

The *Oleates* in general are not crystallizable salts; and those which are not altogether insoluble are mucilaginous before drying; they are usually very fusible.

*Oleate of Potash*.—This salt has a bitter alkaline taste. When mixed with twice its weight of water, it swells and forms a transparent jelly; when this quantity of water is doubled, a syrupy liquor is obtained. A still larger quantity of water does not render it turbid, but after a considerable time a mucilaginous superoleate of potash separates. Alcohol dissolves its own weight of oleate of potash, when heated to 124° Fahr. and it solidifies on cooling; 100 parts of boiling ether dissolve 3.43 parts, and the solution remains fluid when cold. Bi-oleate of potash may also be formed; it is soluble in water and in alcohol both hot and cold, and the solution reddens litmus.

*Oleate of Soda*.—Has a slight smell, and a slightly alkaline taste. Cold water dissolves 1-10th of its weight.

*Oleate of Barytes* is insipid, and insoluble in water. Boiling alcohol dissolves only a small quantity. It is soluble in oleic acid.

*Oleate of Magnesia*.—Has the form of semi-translucent white grains, which soften between the fingers.

*Oleate of Copper*.—This salt is green. It melts when exposed to the heat of the sun.

*Oleate of Lead*.—The neutral oleate is prepared in the moist way. It melts between 144° and 153° Fahr. Alcohol and ether dissolve it slowly when cold and rapidly when hot, without altering its neutrality.

*Superoleate of Lead*.—This salt is liquid at 75° Fahr., and below this temperature becomes an adhesive mass. Boiling alcohol dissolves a little of it, and deposits a neutral salt on cooling. Oil of turpentine and oil of petroleum dissolve it and also the neutral oleate.

OLEIN, or ELAIN. It was first observed by Chevreul that expressed oils and different kinds of fat usually contain P. C., No. 1030.

two oils of different degrees of fusibility, or in other words, two different fatty substances; so that on cooling any expressed oil, one part of it became solid, while another portion retained its fluidity. In consequence of this observation he concluded that all expressed oils are similarly constituted; to the less fusible oil he gave the name of *stearin* (from *stear*, suet), and the more fusible he termed *elain* (from *elaion*, oil), which was afterwards changed to *olein*.

Several methods have been proposed for separating these two substances. When olive oil, for example, is exposed to a low temperature, a portion of it becomes solid, and the remainder retains its fluid form; the former is *stearin*, or *margarin*, and the latter *olein*; these are separated by absorbing the liquid part by blotting-paper, and pressing the solid portion between folds of this paper till it ceases to render it greasy. The olein which the paper has absorbed is then to be separated from it by boiling it in water, on which the olein floats, and the paper sinks.

Olein has scarcely any taste or smell when procured from oils which possess these properties only in a slight degree. Its specific gravity is 0.98, it solidifies at 27° Fahr., and crystallizes in needles. In water it is quite insoluble, but alcohol takes it up largely when boiling; by the alkalis potash and soda it is readily saponified, and during this operation oleic acid is formed by a new arrangement of the elements of the olein and their action on the elements of water; and these changes occur without the evolution of any gaseous matter.

On account of the very low temperature at which olein congeals, it is well adapted for lubricating the wheels of watches, and its value in this respect is enhanced by its not readily becoming rancid by the action of the air.

According to Saussure, the olein of olive oil consists of

Carbon . . .	76.03
Hydrogen . . .	11.54
Oxygen . . .	12.07

—99.64

OLEON is a product obtained by distilling oleic acid mixed with lime; the residue is carbonate of lime, while from the commencement of the operation a fluid substance is obtained, which deposits mere traces of solid matter. This liquid is not acid, but the difficulty of obtaining oleic acid in a pure state has hitherto prevented chemists from determining its exact relation to oleic acid, or accurately determining its composition.

OLE'RON, or OLORON, a town in France, capital of an arrondissement in the department of Basses Pyrénées. It is situated on the Gave d'Oléron, 520 miles from Paris by the road through Poitiers, Bordeaux, Bazas, and Pau.

Oléron is an ancient town, and appears in the 'Itinerary' of Antoninus under the name of Iluro, and in the 'Notitia Provinciarum Gallie' under that of Civitas Elloronensium. From the commencement of the sixth century a bishopric existed here, which was suppressed at the Revolution. In the middle ages the town was ruined by the Saracens and the Northmen, but restored by the care of the viscounts of Béarn. It consists now of three parts: the upper town (*ville haute*), and the lower town (*ville basse*), forming Oléron properly so called, chiefly between the Gave d'Aspe and the Gave d'Osson, or Ossau, which, by their junction, form the Gave d'Oléron; and Sainte Marie, a separate commune on the left bank of the Gave d'Aspe. A portion of the lower town is on the right bank of the Gave d'Osson. The population of the commune of Oléron, in 1831, was 6458 (of whom 5850 were in the town itself); that of Sainte Marie, 3371 (of whom 2718 were in the town): giving an aggregate of 9829. The population of Oléron alone, in 1836, was 6620. The upper town is the oldest part of Oléron, and consists of a few lanes, an ancient church, and a little old market-house on the summit of a hill. The lower town, which contains the greater part of the population, is at the foot of the hill on which the upper town stands. The trade of the place is carried on here. Sainte Marie, united to Oléron by a lofty bridge, is the best laid out and best-built quarter of the whole town: it contains the former cathedral and episcopal palace.

The chief manufactures of the town are of paper, stockings, the woollen caps worn by the Béarnais peasantry, and box and horn combs for the Spaniards: the manufacture of coarse woollen cloths has much decayed. Considerable trade was formerly carried on in Spanish wool, but it is

now trifling. Wool from the surrounding country, sheepskins, cattle, horses, fir timber for masts of ships of war, are sold. Hams, called Bayonne hams, and salted geese, are prepared here and all over the department. There are two yearly fairs. There are some judicial or fiscal government offices in the town.

The arrondissement of Oléron comprehends an area of 712 square miles, and includes 81 communes. It is divided into eight cantons, or districts, each under a justice of the peace. The population, in 1831, was 74,552; in 1836 it was 76,312.

#### OLE'RON, ISLE OF. [CHARENTE INFÉRIEURE.]

**OLE'RON, LAWS OF.** The laws, or constitutions, or judgments of Oleron, are a capitulary of antient marine customs written in old French, and bearing the name of Oleron for several centuries, because tradition points to the island so called [CHARENTE INFÉRIEURE] as the place of their original promulgation. An antient copy of these laws is to be found in the 'Black Book' of the Admiralty, the original of which is supposed to be in the Bodleian Library; but they are not there called the Laws of Oleron, nor is there any reference in the laws themselves, or in the book which contains them, to their origin or history. They are not unfrequently appended to antient editions of the 'Coutumier' of Normandy under the title of 'Les Jugemens de la Mer:' in Cleirac's edition of the 'Us et Coutumes de la Mer' they are given, without any description of the book or place from whence they are taken, under the name of 'Roole des Jugemens d'Oleron.' They are generally referred to by French writers on maritime law as 'Jugemens d'Oleron.' The copies of these laws however published by Cleirac, as well as those appended to the 'Coutumier de Normandie,' differ materially from each other, and also from that in the 'Black Book' of the Admiralty, though many of the articles are almost verbally the same in all. They relate to the rights and duties of ship-owners, mariners, maritime contracts, pilotage, port and custom laws, and losses at sea; but are chiefly remarkable at the present day from the circumstances that they were for several centuries adopted by all the nations of Europe as the foundation of their maritime laws.

It has been generally stated by English law writers that the laws of Oleron were compiled and published by Richard I. in the island of Oleron, on his return from the Holy Land. This statement, which is in substance given by Coke, Selden, Hale, Prynne, Blackstone, Reeve, and several English writers on maritime law, furnishes a curious instance of the readiness with which historical errors are propagated when one writer makes his assertions respecting facts from the statements of another without thought or examination. There is scarcely any fact in history more entirely settled, and few more notorious, than that Richard I., in returning from the Holy Land, was shipwrecked in the Adriatic, near Venice, and was immediately taken by Leopold, duke of Austria, and detained a prisoner in Germany (Rymer's *Fœdera*, vol. i., p. 70); and there is good evidence that at the expiration of his captivity he returned home through Flanders, without touching upon his French dominions. (Hoveden.) It is equally clear, from the account of Hoveden and other chroniclers, that on his way to the East he travelled by land through France, and embarked at Marseille for Sicily. There is therefore not the slightest foundation for the statement that these laws were made by Richard I. at the isle of Oleron on his return from the Holy Land. Indeed the only positive evidence that they were the work of Richard at all is found in what Sir Edward Coke calls a 'notable' record in the Tower (4 Inst., 144), which record is also mentioned by Selden in his 'Mare Clausum' (lib. ii., cap. 24). The part of this record however in which these laws are noticed is dated in the reign of Edward III., and consequently 150 years after Richard's time; and according to Mr. Luders's account of it, the document appears hardly to deserve the name of a record, being merely a roll, consisting of detached membranes, relating to maritime and mercantile affairs of different reigns, miscellaneously thrown together, and without any formal date or description, or anything to give them the authority of a judicial act. (Luders's *Inquiry into the Origin of the Laws of Oleron*.) This document contains the following passage, from which the false story, ascribing this piece of legislation to Richard I. has sprung:—'Quæ quidem leges et statuta per Dominum Ricardum

quondam Regem Angliæ, in reditu suo de Terrâ Sanctâ, correctæ fuerunt, interpretatæ, declaratæ, et in insulâ Oleron publicatæ, et nominatæ in Gallicâ linguâ La Ley Oleroun.' On the other hand, there are strong reasons for attributing to these ordinances a later date than the reign of Richard I., the principal of which are:—1, that they are written in the French language; whereas in the reign of Richard I. all laws of royal ordinance, both in the king's French dominions and in England, were written and promulgated in Latin; 2, that if they had been promulgated in England before the time of Bracton, Britton, and Fleta, they must have been mentioned by those authors; and 3, that the original historians of the reign of Richard I. (though sufficiently ready to record his merits) never mention this part of his legislation.

Mr. Luders conjectures, in the excellent tract above alluded to, that these laws did not proceed from any royal ordinance; but that the men of Oleron, who had corporate privileges granted to them by the name of 'Burgeiens de Olerone,' in the reign of John (Rymer's *Fœdera*, vol. i., p. 111, 112), and had very considerable trade as early as the twelfth century, may have collected adjudged cases upon the laws of the sea, for regulating their own maritime affairs;—that hence the laws of Oleron derived their name; and being received and respected in England and France in the course of the fourteenth century, became known and partially adopted in other nations of Europe. To the copies of the laws appended to the 'Coutumier de Normandie,' and also to those given by Cleirac, in the 'Us et Coutumes,' an attestation by the seal of the isle of Oleron is attached, with the date of 1266. This seal is inventoried as having been once in the treasury of the Court of Exchequer. See Palgrave's 'Kalendars and Inventories of the Exchequer,' vol. i., p. 106.

**OLIBANUM.** This name, of frequent occurrence in comparatively modern works, does not appear to have been known to antient commerce or *Materia Medica*. It appears to have been derived from the Greek *λίβανος*, or the Arabic *loban*, which is applied, as well as the name *Koondur*, to the substance known in Europe by the name *Olibanum*. Avicenna describes a resinous substance under the name *Koondur*, to which, in the Latin translations, *Olibanum* is given as a synonyme, as well as *Thus*, and with this the Arabian author includes a description of the bark, manna, and smoke of *Thus*, or frankincense; in the same way as we find, in Dioscorides, the description of *Libanos*, or *Thus*, followed by that of the other parts we have mentioned, indicating, as is evident indeed from the description, that Avicenna, under *Koondur*, refers to the *λίβανος* of Dioscorides. Both authors mention an Indian kind of the substance. Mr. Colebrooke ascertained (*Asiatic Res.*, ix. and xi.) that *Koondur* was applied in India to a fragrant resin still used there as incense, and which he ascertained to be the produce of the tree which has been already described under the article *BOSWELLIA thurifera*. The name *Koondur* appears derived from the Sanscrit *Koondooroo*, which is applied to *looban* by the Hindus. (*Fl. Ind.*, ii., p. 384.) The tree is common in the mountains of Central India, as well as in those of the Coromandel coast, together with *B. glabra*, the other species of the genus, and which extends as far north as 30° in the Sewalik or sub-Himalayan range of hills.

Dr. Royle mentions that he has collected off the trunk of this species, in the latter locality, some very clear, pure, and fragrant resin, which burns rapidly away with a bright light, diffusing a pleasant odour. Both species yield this fragrant resin, which is employed as incense in India, and which might be much more extensively collected than at present. From the affinity in vegetation between parts of Arabia, Persia, and India, it is not improbable that the genus *Boswellia* may extend to Arabia, and there produce the kind known as *Arabian Olibanum*, the tree yielding which has not yet been traced out by botanists. But with respect to most of the Arabian exports, it is difficult to know whether they are the produce of that country, or have been first obtained by commerce and then re-exported, whence in early times Arabia obtained celebrity for producing so many of the fragrant and aromatic substances which we now know were obtained from Africa and India.

Dr. Royle further states that in Bengal the name *looban* is applied to Benzoin, though in Northern India applicable only to *Koondur*, the produce of *Boswellia thurifera*, and also that in Persian works, Benzoin is distinguished by

the names 'hussee-al-jawa' and 'hussee looban.' (*Illustr. Himal. Bot.*, pp. 177 and 261.)

#### OLIFANT'S RIVER. [CAPE OF GOOD HOPE.]

OLI'GODON, a name given by Boié to some small serpents belonging to the great genus *Coluber*, characterized by their blunt, short, and narrow head, and their want of palatine teeth.

OLIVA is a considerable and well-built town, with 1500 inhabitants, situated in a beautiful country about a mile from the Baltic, in the government of Danzig. It was formerly a Cistercian abbey of great celebrity. The abbey church is a fine building and contains much that is worthy of the notice of travellers. There are 20 altars, of which the high altar is of black marble; one of the largest and finest organs in northern Europe, which was 37 years in building; and a considerable collection of valuable paintings. It was in this town that the memorable treaty of peace was concluded on the 3rd of May, 1660, which put an end to the war between Sweden, Poland, the emperor of Germany, and Brandenburg. John Casimir, king of Poland, gave up his pretensions to Sweden, and the republic ceded to Sweden, Northern Livonia, Esthonia, and the island of Oesel. Sweden renounced Courland, and both parties recognised the independence of Prussia. Hereupon Sweden, by the treaty of Copenhagen, 27th May, 1660, restored to Denmark, Drontheim and Bornholm; lastly it concluded in 1661 the convention of Kardes with Russia, on the basis of the 'Status quo ante Bellum.' Thus the peace of Oliva regulated the political relations of the north. This important event is recorded on a marble tablet which is preserved in the cathedral of Oliva. The prince bishop of Ermeland, who is the abbot, possesses, besides the abbey, a fine palace with an extensive park. One of the greatest ornaments of the town is the Karlsberg, an eminence rising 270 feet above the level of the sea, which commands a most magnificent panorama, embracing on one side the Baltic with the road of Danzig crowded with ships, on another the town of Oliva with the tower of the venerable abbey at the foot of the hill, on a third side the pleasing valley called the Schwabenthal, with many country-houses of the wealthy citizens of Danzig and the steeples of the city in the background, and to the north-west richly wooded hills and mountains. In the vicinity there are several steel, iron, and copper works.

(Müller's *Handbuch*; Böhme, *Acta Pacis Olivensis* *edita*, 1763-1765, Breslau, 4to.)

#### OLI'VA. (Malacology.) [VOLUTA.]

OLIVA'REZ. Gaspar Guzman, Count Duke de Olivarez, was descended from one of the most illustrious families of Castile, which for three centuries had distinguished itself by courage, honour, and loyalty. Alfonso Perez de Guzman, the first of this name of whom mention is made, was the great captain of the thirteenth century, and his exploits against the Moors, as well as in the contest between the two princes of Spain, Don Juan and Don Sancho, have furnished some of the most interesting pages of the history of that period. The virtues and military abilities of this family elevated them to the highest dignities of the kingdom; and the Count Duke de Olivarez reckoned in his lineage, besides the noble house of Medina Sidonia, a long line of illustrious ancestors. But in him the virtues of the first Guzmans were completely lost, nor was he endowed with abilities equal to the times in which he lived, and to the duties of his exalted station.

The Count Duke de Olivarez was born at Rome, about 1587, where his father had been sent as ambassador of Philip III., and was educated in the university of Salamanca. On the termination of his studies, his uncle, the Duke of Uceda, introduced him to the prince of Asturias as gentleman of the bed-chamber, and Olivarez now began to show that love of power which was the passion of his after-life. To gain the affections of him who was to be the ruler of the empire was a great step towards future aggrandizement, and in this he succeeded so completely, that when Philip IV., at the age of seventeen, ascended the throne of Spain, in 1621, Olivarez was intrusted with the management of the affairs of the kingdom. Policy induced him to abstain for a few months from assuming any definite public character, and this apparent disinterestedness endeared him still more to the young king, who, as a token of his increased esteem, conferred on the favourite the title of Duke de San Lucar.

Guzman now laid aside the mask of moderation, and displacing his benefactor the Duke of Uceda, and dismissing

all the best servants of the people and the king, he assumed uncontrolled power. The consciousness that he was building his greatness on the ruin of others, made him so suspicious, that he saw an enemy in every individual whom the late minister had patronised. Actuated by this feeling, he surrounded himself with men who had scarcely any other claim to his confidence than attachment to his person, and he put them in places of the first responsibility; those who had hitherto occupied these places were dismissed, and often imprisoned. Ability and popularity in any individual were, to this jealous favourite, sure causes of alarm; and he who had the misfortune to possess either, was sure to give offence. These acts of injustice were however counterbalanced during the first period of the elevation of Olivarez by various useful regulations, in which he showed a wish to equalise the rights of the Spaniards and to promote the general prosperity of the country. Grants, both unmerited and profuse, which had been made by preceding kings, were recalled; marriage was encouraged by exemption from taxes; foreign artists and agriculturists were invited, by advantageous offers, to settle in Spain; about two-thirds of the idle officials were dismissed, and various sumptuary laws were enforced. Thus the revenue of the state was greatly increased, but the mass of the nation, the labouring part of the community, derived no benefit from these measures. Olivarez, while directing his attention to secondary means, neglected the vital principles on which depend the internal prosperity of a nation, the encouragement of agriculture, commerce, and the mechanical arts. These were suffered gradually to decline, an error which afterwards proved fatal to the popularity of the corrupt favourite; and the discontent excited by distress at home was increased by the constant failure of the minister's negotiations abroad.

Cardinal Richelieu, then first minister of France, and the duke of Buckingham, the favourite and prime minister of Charles I., and particularly the former, possessed abilities which made them more than a match for the unprincipled Spanish minister. Independent of the personal dislike which Olivarez felt towards the cardinal, each of these statesmen entertained views which placed them in constant opposition. The aim of Olivarez was to raise the preponderance of the house of Austria; that of the cardinal, to depress both Austria and Spain. Buckingham sided with the French or Spanish favourite as it suited his interest. Thus though Spain exhausted her coffers in spreading her armies over Holland, Germany, and Italy, whatever advantages she obtained were rendered unavailing by the superior combinations of Richelieu. Olivarez was baffled in every attempt to regain the influence which Spain had once exercised all over Europe, and he brought the country to the verge of ruin.

The unpopularity of Olivarez, owing to these reverses and mistaken policy, had become general, when the insurrections of Catalonia and soon after that of Portugal took place, in 1640, in consequence of the minister's attempts to invade the rights of those states. These events, and more particularly his attempts to trample on the privileges of a proud nobility, in which he had only a selfish object in view, were a death-blow to the power of the minister. He still struggled for three years against his failing fortune, but was at length compelled to abandon the affairs of state. In 1643 he was requested by the king to resign, just at the moment when the death of Richelieu opened to him the prospect of success. Olivarez administered the affairs of Spain for the long period of twenty-two years, but more through the favour of the feeble king whom he governed than by his capacity, and his name has become historical not for the good which he did, but from the position which he occupied. Detested by the whole nation, he spent the short remainder of his life in obscurity. He died in 1643, shortly after his disgrace.

(Céspedes, *Hist. de Felipe IV.*) This writer is partial to Olivarez.

OLIVE OIL has already been mentioned as the produce of *OLEA EUROPÆA*. Olive oil, being so extensive an article of commerce, and the tree in consequence so important as to have been called by one author 'a mine upon earth,' requires separate mention. The olive flourishes only in warm and comparatively dry parts of the world, as the south of France and Spain, in Italy, Sicily, Syria, and the north of Africa. Humboldt has stated that 'the olive flourishes between the parallels of 36° and 44°; wherever



the mean annual temperature is from 62°6' to 58°1', where the mean temperature of the coldest month is not below from 41° to 42°8', and that of the whole summer from 71°6' to 73°4'. Great cold is injurious to it, as that of 1709 was to the olive-trees of France; and as M. Bové states that the olive thrives in Egypt, and Delile that it contributes to the riches of the Fayoum, which is nearly in the latitude of Cairo, it is evident that it is capable of bearing a greater degree of heat, as is probable indeed from its being a native of Asia, having been cultivated in early times in Syria and Palestine by the ancient Hebrews, and known to them by the name of *zait*, and to the Arabs by that of *zaitoon*. It is said to have been introduced by the Phœceans into Marseille.

Olive oil is largely produced in Spain, France, and Italy, though most extensively imported from the last-mentioned country into England. Thus, of 2,791,057 gallons of olive oil imported in 1830, 2,034,237 were from Italy; 639,468 from Spain, 52,004 from Malta, partly at second-hand, 21,467 from Turkey, 11,300 from the Ionian Islands, and about 30,000 at second-hand from the Netherlands and Germany. Provence and Languedoc are the provinces best suited in France to the production of olive-oil, and the finest quality is prepared in the neighbourhood of Aix. It is produced in Lucca and Florence, and exported from Leghorn; also in the kingdom of Naples, chiefly in Apulia and Calabria, and largely exported from Gallipoli, on the east coast of the Gulf of Tarento, whence it is commonly known by the name of Gallipoli oil. The duty levied is 8*l.* 8*s.* a tun (252 wine gallons), and amounts to about 20 per cent., or one-fifth, of the price.

Olive oil is the lightest of the fixed oils, and is largely used in the south of Europe as an article of diet, and likewise in cookery and for salads in the north. It is also used in many of the arts where fine oil is required, as to make the best kinds of soap, and in the woollen manufacture. In a very interesting paper in the volume, 'Vegetable Substances employed as Materials of Manufactures,' it is stated that Gallipoli oil is purified to the highest degree by merely keeping it in cisterns hollowed out of the rock on which the town is built. See also M'Culloch's *Com. Dict.*; and for the culture of the olive, the works of Bernard, Amoreux, and Rozier.

#### OLIVE-TREE. [OLEA EUROPEÆ.]

OLIVELLA, Mr. Swainson's name for a genus, or rather subgenus, separated by him from *Oliva*; and characterized as having two plaits on the columella.

OLIVER, ISAAC, an English painter, was born in the year 1556. He studied first under Hilliard, and received further instruction from Frederick Zuccherro. His chief employment was in painting the portraits in miniature of the most distinguished personages of his time, and many very fine portraits by him are preserved in the collections of the English nobility and gentry. Among them there are some portraits of himself, of Queen Elizabeth, Mary queen of Scots, Prince Henry, son of James I., Ben Jonson, and others, which are admirably finished, and fully justify the high reputation which he enjoyed. A whole-length portrait of Sir Philip Sydney is especially admired. It is no mean testimony to his merit that Rubens and Vandyck painted King James I. after a miniature by this master. He was a good and correct designer, his touch was neat and delicate, and his works are still as highly esteemed as they were by his contemporaries. Though he generally worked in miniature, he frequently painted on a larger size, and sometimes attempted historical subjects, in which there is much merit. He occasionally worked in oil as well as in water-colours, but with little success. His drawings, many of which are copies from Parmegiano, are beautifully finished and highly prized. In the apartment called Queen Caroline's Closet at Kensington Palace, there is a fine drawing by Oliver, the subject of which is the Entombment of our Saviour, and another from Raphael's Murder of the Innocents. He died in 1617, at the age of 61.

OLIVER, PETER, the son and disciple of Isaac, was born in 1601, and though so young at the time of his father's death, had so well profited by his instruction and example, that he attained a degree of perfection in miniature portrait painting indisputably superior to his father or to any of his contemporaries, especially as he did not confine his subjects to a head only. He likewise painted historical pictures, nineteen of which were in the collection of Charles I. and James II. Seven of these are still preserved in Queen Caroline's Closet at Kensington.

#### OLIVES, MOUNT OF. [JERUSALEM.]

OLIVET, JOSEPH THOULIER D', was born at Salins, the 1st of April, 1682, of respectable parents. Having been admitted among the Jesuits, he was sent to their college at Reims in 1700, and afterwards to Dijon and Paris. At Paris he became acquainted with some of the most eminent literary men of the time, and took an active part in the controversy, which then existed in the French Academy, on the comparative merits of the ancient and modern writers. He warmly supported the claims of the Latin and Greek writers to our attentive study, in opposition to the opinions of Fontenelle, La Mothe, and Perrault. Olivet left the society of the Jesuits about the year 1714, much to their regret, who offered him the place of instructor to the prince of Asturias to induce him to remain.

In 1723 Olivet was elected a member of the French Academy. He passed the remainder of his life at Paris, engaged in various literary works, and in occasional squabbles with his associates in the Academy. He died at the advanced age of 86, on the 8th of October, 1768. The personal character of Olivet appears, notwithstanding the attacks of some of his enemies, to have been without reproach. Among his numerous friends, who always spoke of him with the greatest respect, no one appears to have had a higher opinion of his talents and virtues than Voltaire, who was introduced by Olivet into the French Academy. (*Discours de M. de Voltaire à l'Académie Française*, Œuvres complètes, vol. 46.) Several letters of Voltaire to Olivet are extant.

The principal work of Olivet is his edition of Cicero, which was originally published at Paris in 1740-1742, in 4 volumes 4to. This edition, which is of little critical value, contains many useful notes, chiefly extracted from preceding commentators. It was reprinted at Geneva in 1758, in 9 volumes 4to., and very incorrectly at Oxford in 1783, in 10 volumes 4to. Olivet's translations of Cicero are some of the best that have been published, though, like most of the French translations, they are deficient in accuracy. Of these the principal are, the 'De Natura Deorum,' 1721, 1732, &c.; the 'Tusculanæ Quæstiones,' 1737, 1747, of which the third and fifth books are translated by Boubier; the Orations against Catiline, together with the 'Philippics' of Demosthenes, 1727, 1736, &c. He also edited extracts from Cicero with a translation into French, under the title of 'Pensées de Cicéron,' which has been frequently reprinted and extensively used in the French schools. The only other work of Olivet worthy of notice is his continuation of Péllisson's 'History of the French Academy' (*Histoire de l'Académie Française*), published originally in 1743, in 2 vols. 4to., and reprinted in 1730, in 2 vols. 12mo.

OLIVIER, CLAUDE MATTHIEU, born at Marseille in 1701, became councillor to the parliament of Paris, and distinguished himself as a pleader. He was one of the founders of the University of Marseille. He wrote several works, the principal of which is the 'Histoire de Philippe Roi de Macédoine et Père d'Alexandre le Grand,' 2 vols. 12mo., Paris, 1740, published after the death of the author. He wrote also a dissertation on the 'Critias' of Plato, which is in the 'Mémoires de Desmolets,' two 'Mémoires sur les Secours donnés aux Romains par les Marseillais pendant la Seconde Guerre Punique et durant la Guerre contre les Gaulois,' a 'Parallel of Tibullus and Ovidius,' and other minor productions. Olivier died at Marseille in 1736.

OLIVIER, GUILLAUME ANTOINE, born near Frejus in 1756, studied medicine at Montpellier, where he took his doctor's degree at the age of seventeen. He afterwards applied himself especially to the study of natural history, and having settled at Paris, published several memoirs which made him known to persons in office. At the time of the Revolution, the Girondin minister Roland, having conceived the idea of sending a mission to Persia for commercial and political purposes, appointed Olivier, and Bruguières, another naturalist. They set off for Constantinople in April, 1793, but soon after the Girondins having been replaced by Robespierre and the terrorists, Olivier and his companion were left without resources to prosecute their journey. They however took courage, and with the assistance of the French consuls in the Levant, they visited Egypt, Syria, and other parts of the Ottoman empire, and then proceeded by Mosul and Bagdad to Persia, and arrived at Teheran in July, 1796. The ruler of Persia was then the eunuch Aga Mehemet Khan, a ferocious tyrant. His minister however received the French envoys with courtesy, but owing to the distracted state of

he country, nothing was effected towards the object of the mission. Olivier and his companion visited Kom, Ispahan, and other places, after which they retraced their steps to Bagdad in November, 1796. From Bagdad they returned to Syria, and thence by Cyprus and Asia Minor to Constantinople. They then repaired to Athens, and from thence to Patras and Corfu, where they embarked on board a French frigate for Ancona, at which place they arrived in September, 1798. After his return to France Olivier prepared a narrative of his travels, which were published in 3 vols. 4to., with an atlas, Paris, 1807. The style is plain and unassuming; the observations are generally sensible and correct, and the author has added a sketch of the history of Persia from the usurpation of Nadir Shah to the end of the eighteenth century, when Fetah Ali Khan took possession of the throne. There is also considerable information concerning Mesopotamia, the Koords, and Bagdad, as well as regarding the Greek islands.

Olivier continued his studies of natural history, and published the '*Histoire Naturelle des Coléoptères*,' 6 vols. 4to., Paris, 1808; and also '*Dictionnaire de l'Histoire Naturelle des Insectes*,' in which he was assisted by others, in 9 vols. 4to. He died at Lyon in 1814.

OLLMÜTZ is one of the six circles of the Austrian margravity of Moravia: it has an area of 1900 square miles, with a population of above 400,000 inhabitants.

OLLMÜTZ, formerly the capital of the margravity, but now only the chief town of the circle, is a well-built and strongly fortified town, in 49° 33' N. lat. and 17° 9' E. long. It is situated between two arms of the river Marsh, by which it is nearly surrounded. The houses are substantial and lofty, but gloomy, and most of them are raised on square buttresses, with piazzas. Ollmütz has four gates, five suburbs, and several remarkable public buildings and institutions of various kinds. There are thirteen churches, including the cathedral, which is an antient venerable pile of building. A magnificent edifice, which was formerly a college of the Jesuits, is now converted into barracks. The University library is likewise a fine structure, formerly a seminary of the Jesuits; and its collection of books, which has been augmented by those of suppressed monasteries, consists of above 50,000 volumes. The town-hall is a handsome edifice, detached from any other building, with a tower 250 feet high, in which is a very remarkable and once celebrated clock, which however has long been out of repair. The palace of the archbishop is a very extensive building, magnificently fitted up, but the prelate generally resides at Kremsier. The University, founded in 1581, was transferred to Brünn in 1784, but re-established in 1827: it consists of four faculties, and has between 600 and 700 students. Among the public institutions are a gymnasium, an episcopal seminary, a school for military cadets, a great infirmary, lying-in-hospital and orphan asylum, and the central board for the management of the affairs of widows and orphans in all the Austrian hereditary dominions. The population is stated by Cannabich, in 1836, at 13,588, but the '*Conversations Lexicon*,' 1836, makes it amount to 19,000. The town has considerable manufactories of woollen cloths, numerous tanneries, and a brisk trade, an important article of which is the sale of cattle from Russia and Moldavia. The bishopric of Ollmütz, which is very antient, was erected into an archbishopric in 1777, and is one of the richest benefices in Austria. In 1758 Ollmütz was besieged by Frederick II., but bravely defended by the garrison, assisted by the inhabitants, till Marshal Daun came to its relief. The empress Maria Theresa testified her satisfaction by conferring on the town various rewards and honours.

(Stein, *Geogr. Lexicon*; Hassel, *Handbuch*; Cannabich, *Geographie*; *Oesterreichische National Encyclopädie*.)

OLME'DO, a town in the kingdom of Leon in Spain, situated in 41° 18' N. lat. and in 4° 37' W. long. It is in the province of Valladolid, and within the bishopric of Avila, and is the chief town of the small *partido*, or district, which bears its name. It lies near the confines of the provinces of Segovia and Avila, and is 8 leagues from Valladolid, 3 from Medina del Campo, 11 from Segovia, and 22 from Madrid.

The town is situated on an eminence on the eastern side of an extensive plain, fertile in wheat, rye, barley, oats, wine, and fruits, and affording pasturage to large flocks of sheep, and a few horses and horned cattle. At the base of the hill flows the Eresma, and at the distance of a league to the west the plain is intersected by the Adaja, both tribu-

aries of the Duero. Olmedo was formerly strongly fortified, and still preserves an enclosure of walls. The population, according to Miñano, was in 1826 about 2150. It contains six parish churches, seven convents (two of monks and five of nuns, all suppressed in 1835), two hospitals, a public granary, and a posting establishment. A brandy-distillery, a saw-mill, and two tile-works, are the only manufactories. Its annual contribution to the royal treasury is 32,000 reales, or about 340*l*.

Olmedo is celebrated in Spanish history as the seat of several cortes, and for two sanguinary battles fought in its neighbourhood, the first in 1445, in which Juan II. of Castile obtained a victory over the Aragonese; the second, fought in 1467, between Enrique IV. of Castile and the rebels headed by his brother the Infante Don Alonso.

(Miñano; Laborde; Mariana.)

OLNEY. [BUCKINGHAMSHIRE.]

OLONETZ is an extensive government of Great Russia, comprised between 60° 30' and 66° 30' N. lat. and 29° 40' and 40° 20' E. long. According to Schubert the area is 79,520\* square miles, including the great lake Ladoga, and the population 359,800. It is bounded on the north and north-east by Archangel, on the south-east by Wologda, on the south by Novogorod, on the south-west by Petersburg, and on the west by Lake Ladoga and Finnland.

*Face of the Country; Soil; Climate.*—As this government extends to the polar circle, its northern half has entirely the character of the high northern latitudes, while the southern part has more of the character of the temperate zone. The Scandinavian mountains enter the country from the north-west, surround the two great lakes Ladoga and Onega, and run to the borders of Petersburg and Novogorod. This range is low and rocky, the highest summits scarcely rising more than from 300 to 420 feet above the general level, yet they are covered during a great part of the year with snow. The country at their base is in general low, wet, and swampy. The summits are clothed with thick forests of fir and other timber: the declivities are in some places open and susceptible of cultivation. Blocks of granite, some of them of enormous size, are scattered all over the mountains. The dry, open, and wooded parts contain under the greensward pure or clayey mould over clay mixed with boulders of the rocks of the country: in the morasses bog-iron ore abounds, with deep sand and clay. The surface may be said to be equally divided between mountains and forests, open tracts, morasses, and water.

This government contains 1998 lakes, and 858 rivers and rivulets. The two greatest lakes are Ladoga and Onega: of the former, only the larger portion is in this government, the remainder being in Petersburg and Archangel; but we have included, after Hassel, the whole area of 6100 square miles in the area of this government. Lake Onega is nearly in the centre of the government: its mean length is 130 miles, and the breadth from 70 to 80 miles. Like Lake Ladoga, it contains numerous islands, most of which are covered with forests. Among the largest of the other lakes are Sego, Wiga, Kemscha, Leckta, Wodlo, Latscha, Kounta, and Nuk. The principal rivers are the Svir, which runs from Lake Onega into Lake Ladoga, and though full of boulders, is navigable; the Olonka, the Ruskola, and the Janex, all which run into Lake Ladoga. The following rivers run into Lake Onega:—the Wytegra, the Wode, the Lisch, and the Suma, all flowing from lakes of the same names, and the Losocha. The most considerable river however is the Onega, which issues from Lake Lussa, near Lake Onega, and running through the government of Archangel, falls into the White Sea. In many of these rivers there are waterfalls, the most remarkable of which is that called Kiwatscha, in the river Suna. With the exception of the circle of Kem, the climate is pretty uniform: the spring is long and damp, with frequent night frosts; the summer short, with many foggy days, the vegetation being however very vigorous, on account of the length of the days: the autumn is bleak; the winter long and severe. In 1787 quicksilver froze in Wytegra. The corn, notwithstanding, ripens well; but unforeseen accidents sometimes destroy the entire harvest. The health of the inhabitants does not suffer by the cold.

*Natural Productions.*—Notwithstanding the cold and

\* This estimate includes the circle of Kem, which some writers assign to Archangel, as is done in the article *ACHANGEL*. Hassel, 1821, follows Georgi, who expressly states that Kem was taken from Archangel and added to Olonetz, by order of Alexander, in 1801. Horschelmann, 1835, gives Kem to Olonetz; Schmitler, 1835, and Cannabich, 1836, give it to Archangel. Without Kem, Olonetz is divided into seven circles.

severe winter and the short summer, agriculture is carried on in all the circles, even in that of Kem, which is between 64° and 66° 30' N. lat. The inhabitants cannot however raise sufficient corn for their own consumption, and are obliged to import from other governments. Flax and hemp thrive, and are extensively cultivated. There is no fruit, but the want of it is in some measure compensated by the abundance of wild berries, such as cranberries, bilberries, &c. There are numerous small gardens, in which turnips, carrots, radishes, onions, and sometimes cucumbers and potatoes are cultivated. The government is well provided with timber; and the crown forests alone cover 8,956,795 dessatines. Except the oak and beech, almost all the forest trees common in Russia flourish here, except in the circle of Kem. The southern mountains, the islands in Lake Onega, and the circle of Karapel, are rich in forests, in which there are not only the finest larches, but pines fit for masts of 100 feet in length. The inhabitants in fact derive their chief means of subsistence from the forests, which supply them not only with fuel and timber for building their houses and boats, but likewise with rosin, turpentine, pitch, tar, charcoal, tanners'-bark, barks, planks, and laths for exportation.

The fur-bearing animals furnish a profitable article of commerce. The breeding of cattle is not carried on to any extent, because their maintenance in the long winter is too expensive. Almost every peasant however has a couple of horses, cows, sheep, swine, and some domestic fowls. The wild animals are bears, wolves, elks, gluttons, many greyish-red and a few black foxes, a great number of badgers, and wild reindeer. Seals are found in the two great lakes. Waterfowl of various kinds abound. The fisheries are very productive: great quantities of sturgeon and salmon are sent to St. Petersburg. The minerals are granite, serpentine in large masses and of excellent quality, porphyry of various colours, sandstone, quartz, lime, clay, slate, alabaster, talc in large tables, plaster of Paris, and marble, which is procured in great abundance, especially at Twidia, on the west side of Lake Onega. There is likewise a good deal of iron, which is partly smelted in six great furnaces, and partly by the inhabitants in small furnaces, and wrought into various articles for domestic use. One manufactory of coppers produces annually 36,000 lbs. Besides these metals and minerals, the province has copper and gold mines, but not sufficiently rich to defray the expenses of working them; there are also silver, lead, and sulphur. Salt is obtained from some springs, but not sufficient for the supply of the inhabitants.

**Manufactures and Trade.**—It may be presumed that in a country so far to the north, with a scanty population,\* there can be few manufacturing establishments on a great scale. More might be done if the inhabitants did not prefer going to seek employment in the other provinces, particularly in harvest time. The articles exported are the natural productions of the government, cannon from a foundry belonging to the crown, cast-iron, and some tallow: by far the greater part of the exports goes to Petersburg, and the remainder to Archangel.

The great majority of the inhabitants are Russians: in the western part there are many Finns, some of whom have embraced the religion of the Russian-Greek Church, while a large portion are still Lutherans. There are a few nomade Laplanders in the circle of Kem.

**Education.**—Schnitler, in 1835, says: 'For public instruction Olonez is under the university of St. Petersburg. In 1824 there were 10 schools, with 22 masters and 349 scholars, of whom 4 were girls; in 1832, 11 schools, with 31 masters and 402 scholars. We do not know the state of the ecclesiastical schools. There is not one bookseller in the whole government, and only one printing-office, which belongs to the crown.' There is no great town.

OLONETZ, the former capital, is situated in 61° 0' 45" N. lat. and 32° 50' E. long., on the river Olonka. It is an open town, with 2800 inhabitants. There are three stone and five wooden churches. A good deal of fine thread is manufactured here, and a considerable trade is carried on, partly across Lake Ladoga with Petersburg, and partly at the two annual fairs. The first dockyard established by Peter the Great was at Onega, and ship-building is still carried on.

\* According to Schubert (1836), only 5 inhabitants to an English square mile: it must however be remembered that the area of the two great lakes and of the numerous small ones is included.

PETROZAVODSK, the present capital, is situated in 61° 47' N. lat. and 34° 24' E. long., on a bay of Lake Onega, and was so named by the empress Catherine II. from many manufactories (zavod) erected by Peter the Great, but now in ruins. It is an ill-built uninteresting town, remarkable only for the great imperial cannon-foundry.

(Hassel, *Handbuch*; Stein, *Geogr. Lexicon*; Cannabich, *Geographie*; Schnitler, *La Russie, la Pologne, et la Finlande*, 1 vol. 8vo., Paris, 1835.)

OLONNE, LES SABLES D'. [VENDÉE.]

OLYGY'RA, M. Say's name for a genus of operculated pulmoniferous gastropods, which, as well as *Ampullina* of M. de Blainville, M. Rang would refer to the genus *Helicina* of Lamarck. [HELICIDÆ, vol. xii., p. 109.]

OLYMPIAD. [ÆRA.]

OLYMPIAN GAMES, the chief of the four great national festivals of the Greeks, were celebrated at Olympia, a sacred spot on the banks of the Alpheus, near Elis, every fifth year. The exact interval at which it recurred was one of forty-nine and fifty lunar months alternately; so that it fell sometimes in the month of Apollonius (July), sometimes in the month of Parthenius (August). (Boeckh ad *Pind. Olymp.*, iii. 18, p. 138; Müller's *Dorians*, vol. i., p. 261, trans.) The period between two celebrations was called an Olympiad. It lasted five days.

The origin of this festival is concealed amidst the obscurity of the mythic period of Grecian history. Olympia was a sacred spot and had an oracle of Jupiter long before the institution of the games. The Eleans had various traditions which attributed the original foundation of the festival to gods and heroes at a period long before the Trojan War, and among these to the Idæan Hercules, to Pelops, and to Hercules the son of Alcmena. The Eleans further stated, that after the Atolians had possessed themselves of Elis, their whole territory was consecrated to Jupiter; that the games were revived by their king Iphitus, in conjunction with Lycurgus, as a remedy for the disorders of Greece; and that Iphitus obtained the sanction of the Delphic oracle to the institution, and appointed a periodical sacred truce, to enable persons to attend the games from every part of Greece and to return to their homes in safety. This event was recorded on a disc, which was preserved by the Eleans, on which the names of Iphitus and Lycurgus were inscribed. (Plutarch, *Lycurg.*, 1; Pausan., v. 20, 31.) Other accounts mention Cleosthenes of Pisa as an associate of Iphitus and Lycurgus in the revival of the festival. 'All that can be safely inferred from this tradition, which has been embellished with a variety of legends, seems to be, that Sparta concurred with the two states most interested in the plan, and mainly contributed to procure the consent of the other Peloponnesians.' (Thirlwall's *History of Greece*, vol. i., p. 386.) The date of the revival of the festival by Iphitus is, according to Eratosthenes, 884 B.C.; according to Callimachus, 828 B.C. Mr. Clinton prefers the latter date. (*Fasti Hellenici*, vol. ii., p. 408, note h.) The Olympiads began to be reckoned from the year 776 B.C., which Coræbus was victor in the foot-race. We have lists of the victors from that year, which always include the victors in the foot-race, and in later times those in the other games. (Pausan., v. 8. 3.)

This, like all the other public festivals, might be attended by all who were of the Hellenic race, though at first probably the northern Greeks and perhaps the Achæans of Peloponnesus were not admitted. Spectators came to Olympia not only from Greece itself, but also from the Grecian colonies in Europe, Asia, and Africa. Among them were solemn deputations sent to represent their respective states. Women however were forbidden to appear at Olympia, even to cross the Alpheus, during the festival, under pain of death. But at a later period we find women taking part in the chariot-race, though it is doubtful whether they drove their own chariots. An exception was made to this law of exclusion in favour of the priestess of Ceres and certain virgins, who were permitted to be present at the games, and had a place assigned to them opposite the judges. The management of the festival was in the hands of the Eleans. Originally indeed Pisa, in which state Olympia lay, seems to have had an equal share in the administration; but in the fiftieth Olympiad the Eleans destroyed Pisa, and from that time they had the whole arrangement of the games. They proclaimed the sacred truce, first in their own territories, and then throughout the rest of Greece. This truce took effect from the time of its proclamation in Elis, and

while it lasted the Elean territory was inviolable, any armed invasion of it being esteemed an act of sacrilege. On this privilege the Eleans founded a claim to have their territory always considered sacred, though in fact they themselves did not abstain from war. As the presiding nation, they gave laws for the regulation of the festival, imposed penalties on individuals and states, and had the power of excluding from the games those who resisted their decrees. They actually thus excluded the Lacedæmonians on one occasion and the Athenians on another.

The Eleans appointed the judges of the contests, who were called Hellanodicæ. (Paus., v. 9. 4, 5.) They were instructed in the duties of their office for a period of ten months before the festival by Elean officers, called Nomophylacæ (Paus., vi. 24. 3): they were sworn to act impartially, and an appeal might be made from their decision to the Elean senate. (Paus., vi. 24. 3.) Their number varied at different periods: in the 106th Olympiad it was fixed at ten, which was the number ever afterwards. The judges had under them officers, called *ἀλῦται*, whose business was to keep order. These officers were called *μαστιγόφοροι* in the other Grecian games.

The Olympian festival consisted of religious ceremonies, athletic contests, and races. The chief deity who presided over it was Jupiter Olympius, whose temple at Olympia, containing the ivory and gold statue of the god by Phidias, was one of the most magnificent works of art in Greece. (Paus., v.) The worship of Apollo was associated with that of Jupiter (Müller's *Dorians*, vol. i., p. 279-281, trans.); and the early traditions connect Hercules with the festival. (*Ibid.*, p. 453.) This is another proof of the Dorian origin of the games, for Apollo and Hercules were two of the principal deities of the Doric race. There were altars at Olympia to other gods, which were said to have been erected by Hercules, and at which the victors sacrificed. The most magnificent sacrifices and presents were offered to Jupiter Olympius by the competitors and by the different states of Greece.

The games consisted of horse and foot races, leaping, throwing, wrestling, and boxing, and combinations of these exercises. 1. The earliest of these games was the *foot-race* (*δρόμος*), which was the only one revived by Iphitus. The space run was the length of the stadium in which the games were held, namely, about 600 English feet. In the 14th Olympiad (724 B.C.) the *διανός* was added, in which the stadium was traversed twice. The *δάλιχος*, which consisted of several lengths of the stadium (seven, twelve, or twenty-four, according to different authorities), was added in the 15th Olympiad (B.C. 720). A race in which the runners wore armour (*ὀπλιτῶν δρόμος*) was established in the 65th Olympiad, but soon after abolished. 2. *Wrestling* (*πάλη*) was introduced in the 18th Olympiad (B.C. 708). The wrestlers were matched in pairs by lot; when there was an odd number, the person who was left by the lot without an antagonist wrestled last of all with him who had conquered the others. He was called *ἡρδρος*. The athlete who gave his antagonist three throws gained the victory. There was another kind of wrestling (*ἀνακλινοπάλη*), in which, if the combatant who fell could drag down his antagonist with him, the struggle was continued on the ground, and the one who succeeded in getting uppermost and holding the other down gained the victory. 3. In the same year was introduced the *pentathlon* (*πένταθλον*), or, as the Romans called it, *quinquertium*, which consisted of the five exercises enumerated in the following verse, which is ascribed to Simonides:—

“*Ἄλμα, ποδωκίην, δίσκον, ἄκοντα, πάλην,*

that is, ‘leaping, running, throwing the quoit, throwing the javelin, wrestling.’ Others give a different enumeration of the exercises of the pentathlon. In leaping, they carried weights in their hands or on their shoulders: the object was to leap the greatest distance, without regard to height. The discus, or quoit, was a heavy weight of a circular or oval shape; neither this nor the javelin was aimed at a mark, but he who threw farthest was the victor. In order to gain a victory in the pentathlon, it was necessary to conquer in each of its five parts. 4. *Boxing* (*πυγμή*) was introduced in the 23rd Olympiad (B.C. 688). The boxers had their hands and arms covered with thongs of leather, called *cestus*, which served both to defend them and to annoy their antagonists. Virgil (*Æn.*, v. 405) describes the *cestus* as armed with lead and iron; but this is not known to have been the case

among the Greeks. 5. The *pancratium* (*παγκράτιον*) consisted of boxing and wrestling combined. In this exercise and in the *cestus* the vanquished combatant acknowledged his defeat by some sign; and this is supposed to be the reason why Spartans were forbidden by the laws of Lycurgus to practise them, as it would have been esteemed a disgrace to his country that a Spartan should confess himself defeated. In these games the combatants fought naked. (Thuc., i. 6.)

The horse-races were of two kinds. 1. The *Chariot-race*, generally with four-horsed chariots (*τετράων δρόμος*), was introduced in the 25th Olympiad (B.C. 680). The course (*ἵπποδρόμος*) had two goals in the middle, at the distance probably of two stadia from each other. The chariots started from one of these goals, turned round the other, and returned along the other side of the hippodrome. This circuit was made twelve times. The great art of the charioteer consisted in turning as close as possible to the goals, but without running against them or against the other chariots. The places at the starting-post were assigned to the chariots by lot. There was another sort of race between chariots with two horses (*δύων or σύνων*). A race between chariots drawn by mules (*ἄπηνη*) was introduced in the 70th Olympiad, and abolished in the 84th. 2. There were two sorts of *races on horseback*, namely, the *κίλης*, in which each competitor rode one horse throughout the course, and the *καλπη*, in which, as the horse approached the goal, the rider leaped from his back, and keeping hold of the bridle, finished the course on foot.

In the 37th Olympiad (B.C. 632) racing on foot and wrestling between boys was introduced. There were also contests in poetry and music at the Olympian festival.

All persons were admitted to contend in the Olympic games who could prove that they were freemen, that they were of genuine Hellenic blood, and that their characters were free from infamy and immorality. So great was the importance attached to the second of these particulars, that the kings of Macedon were obliged to make out their Hellenic descent before they were allowed to contend. The equestrian contests were necessarily confined to the wealthy, who displayed in them great magnificence; but the athletic exercises were open to the poorest citizens. An example of this is mentioned by Pausanias (vi. 10. 1). In the equestrian games moreover there was no occasion for the owner of the chariot or horse to appear in person. Thus Alcibiades on one occasion sent seven chariots to the Olympic games, three of which obtained prizes. The combatants underwent a long and laborious training, the nature of which varied with the game in which they intended to engage. Ten months before the festival they were obliged to appear at Elis to enter their names as competitors, stating the prize for which they meant to contend. This interval of ten months was spent in preparatory exercises; and for a part of it, the last thirty days at least, they were thus engaged in the gymnasium at Elis. When the festival arrived, their names were proclaimed in the stadium, and after proving that they were not disqualified from taking part in the games, they were led to the altar of Jupiter the guardian of oaths (*Ζεὺς ἑρκιος*), where they swore that they had gone through all the preparatory exercises required by the laws, and that they would not be guilty of any fraud, nor of any attempt to interfere with the fair course of the games. Any one detected in bribing his adversary to yield him the victory was heavily fined. After they had taken the oath, their relations and countrymen accompanied them into the stadium, exhorting them to acquit themselves nobly.

The prizes in the Olympic games were at first of some intrinsic value, like those given in the games described by Homer. But after the 7th Olympiad, the only prize given was a garland of wild olive, cut from a tree in the sacred grove at Olympia, which was said to have been brought by Hercules from the land of the Hyperboreans. Palm leaves were at the same time placed in the hands of the victors, and their names, together with the game in which they had conquered, were proclaimed by a herald. A victory at Olympia, besides being the highest honour which a Greek could obtain, conferred so much glory on the state to which he belonged, that successful candidates were frequently solicited to allow themselves to be proclaimed citizens of states to which they did not belong. Fresh honours awaited the victor on his return home. He entered his native city in triumph, through a breach made in the wall for his reception; banquets were given to him by his friends, at wh

odes were sung in honour of his victory; and his statue was often erected, at his own expense or that of his fellow-citizens, in the Altis, as the ground at Olympia which was consecrated to the games was called. At Athens, according to a law of Solon, the Olympic victor was rewarded with a prize of 500 drachms: at Sparta the foremost place in battle was assigned to him. Three instances are on record in which altars were built and sacrifices offered to conquerors in the Olympic games.

It seems to be generally admitted that the chief object of this festival was to form a bond of union for the Grecian states. Besides this, the great importance which such an institution gave to the exercises of the body must have had an immense influence in forming the national character. Regarded as a bond of union, the Olympian festival seems to have had but little success in promoting kindly feelings between the Grecian states, and perhaps the rivalry of the contest may have tended to exasperate existing quarrels; but it undoubtedly furnished a striking exhibition of the nationality of the Greeks, of the distinction between them and other races. Perhaps the contingent effects of the ceremony were after all the most important. During its celebration, Olympia was a centre for the commerce of all Greece, for the free interchange of opinions, and for the publication of knowledge. The concourse of people from all Greece afforded a fit audience for literary productions, and gave a motive for the composition of works worthy to be laid before them. Poetry and statuary received an impulse from the demand made upon them to aid in perpetuating the victor's fame. \* [PINDAR.]

But the most important and most difficult question connected with the subject is whether their influence on the national character was good or evil. The exercises of the body, on which these games conferred the greatest honour, have been condemned by some philosophers as tending to unfit men for the active duties of a citizen (Arist., *Pol.*, vii. 14, 18; Athen., x., p. 413); while they are regarded by others as a most necessary part of a manly education, and as the chief cause of the bodily vigour and mental energy which marked the character of the Hellenic race.

The above description of the Olympian games will serve also for the most part for the other three great festivals of Greece. The chief points of difference between them will be seen by referring to the articles ISTHMIAN GAMES, NEMEAN GAMES, and PYTHIAN GAMES.

(Pausanias, v., vi., &c.; West's Pindar, *Preliminary Dissertation*; Wachsmuth's *Hellenische Alterthumskunde*, Th. i., p. 108; Potter's *Grecian Antiquities*, vol. i., p. 495; Thirlwall's *History of Greece*, vol. i., p. 384.)

OLYMPIAS. [PHILIP OF MACEDON.]

OLYMPIODO'RUS. There were several Greek writers of this name.

OLYMPIODORUS of Thebes in Egypt continued the chronicle of Eunapius to A.D. 425. Of the twenty-two books of his history (*ἱστορικὸν λόγος*), which he entitled 'Materials for History,' only a fragment is preserved in the *Myriobiblon* of Photius (80). His history began with the seventh consulship of the emperor Honorius, and was brought down to the accession of Valentinian. The work was dedicated to the younger Theodosius. The historian appears to have been employed on public business, for he mentions being sent on a mission to Donatus, king of the Huns. In his description of the African oases he speaks of wells being made to the depth of 200, 300, and even 500 cubits, and of the water rising up and flowing from the aperture. Some have supposed that these must have been Artesian wells. [ARTESIAN WELLS, p. 414.] Olympiodorus was a heathen.

OLYMPIODORUS of Alexandria, who is said to have lived in the latter part of the sixth century A.D., was a Peripatetic, and wrote a commentary on the 'Meteorologica' of Aristotle, which was printed by Aldus, Venice, 1561, fol. He is sometimes called the Younger, to distinguish him from the Peripatetic philosopher of the same name who was the master of Proclus, but who is not known to us by any extant work.

OLYMPIODORUS, a Platonic philosopher, and also a native of Alexandria, lived probably in the latter part of the sixth century A.D. There are extant by him commentaries on the 'First Alcibiades,' 'The Phædon,' 'The Gorgias,' and 'Philebus' of Plato. The first-mentioned of these commentaries contains a life of Plato. His commentary on the 'Gorgias' was published by Routh, in his edition of the 'Gorgias' and 'Euthydemus,' Oxford, 1784; that on the 'Phædon,' by Andreas Mustoxydes and Demetrius Schinas,

in the *συλλογὴ ἀποσπασμάτων ἀναικτόρων*, Ven., 1817; that on the 'Philebus,' by Stallbaum, in his edition of the 'Philebus'; and that on the First Alcibiades, by Creutzer, in the 2nd and 3rd volumes of the 'Initia Philosoph. ac Theolog. ex Platonis Fontibus,' Frankf., 1826.

OLYMPUS. [ANATOLIA; CRETE; THESSALY.]

OLYNTHUS, a town in Macedonia, at the head of the Thracian Gulf, was probably founded by the Chalcidians and Eretrians of Eubœa. (Strabo, x., p. 447.) It was sixty stadia from Potidæa, and was visible from the latter place. (Thuc., i. 63.) At the time of the invasion of Greece by Xerxes, Olynthus was in the hands of the Bottiæi, who had removed thither from Bottiæis on the Thermaic Gulf, but Artabazus, who was conducting Xerxes to the Hellespont after the defeat at Salamis, suspecting the fidelity of the Bottiæi, took the town from them and gave it to the Chalcidians. (Herod., viii. 127.) Olynthus, together with the other Greek towns on the coast of Macedonia, afterwards fell under the dominion of the Athenians; but it revolted from them at the beginning of the Peloponnesian war, and asserted its independence, which was completely secured by the conquests of Brasidas. From this time Olynthus became the most important of the Chalcidian towns, and the head of a powerful league, which was formed by admitting the citizens of the neighbouring towns to the enjoyment of the same civil and political rights as the Olynthians themselves possessed. Many of the principal towns of Macedonia, and among others Pella, joined this league; which soon became sufficiently formidable to excite the jealousy of the Lacedæmonians. They therefore gladly availed themselves of an opportunity which occurred for declaring war against Olynthus. The towns of Apollonia and Acanthus had been invited by the Olynthians to join the confederacy, with a threat of war in case they refused. Being unwilling to comply with the demands of the Olynthians, and unable to defend themselves, they applied to the Lacedæmonians for assistance, who sent an army of 10,000 men, under the command of Telentias, the brother of Agesilaus, A.C. 382. Telentias obtained some slight advantages at first, but in the spring of the following year (A.C. 381) his army was completely defeated, and he himself was killed in the battle. (Xen., *Hellen.*, v. 2, § 11-43; iii., § 1-6.) Telentias was succeeded in the command by Agesipolis, one of the kings of Sparta, who died however soon afterwards; and the conduct of the war accordingly devolved upon his successor Polybiades, who defeated the Olynthians and compelled them to sue for peace, which was granted (A.C. 379) on the condition that the Olynthians should acknowledge their dependence upon the Lacedæmonians, and assist them in all their wars. (Xen., *Hellen.*, v. 3, § 26.) We accordingly read of the Olynthian cavalry serving in the Lacedæmonian army against the Thebans. (Xen., *Hellen.*, v. 4, § 54.)

After the Spartan supremacy had been destroyed by the conquests of Epaminondas, the Olynthians again recovered their independence, and restored their confederacy. Their growing power however excited the jealousy of Philip, who entered into an alliance with the Athenians with the view of making war upon Olynthus. He took Potidæa and Torone, two of the most powerful of the confederate cities; but he made peace with the Olynthians after his quarrel with the Athenians.

In B.C. 349 the Olynthians broke off their alliance with Philip, and sent to Athens for assistance. The Athenians, by the advice of Demosthenes, who advocated the cause of the Olynthians in his three Olynthiac Orations [DEMOSTHENES], sent troops to their aid, under the command successively of Chares and Charidemus; but the Olynthians were nevertheless defeated, and obliged to surrender their town, which was destroyed by Philip, B.C. 347. (Diod., xvi. 53.)

Meceberna was the harbour of the Olynthians. (Strabo, vii., p. 330; compare Herod., vii. 122.) It appears to have been in the possession of the Athenians during the early years of the Peloponnesian war, and was not recovered by the Olynthians till B.C. 431. (Thuc., v. 39.)



Coin of Olynthus.  
British Museum. Actual Size.



**OMALAXIS**, a name given by M. Deshayes to a form among the *Trochidae*, closely allied to *Solarium*, if not identical with it, and afterwards changed by the same author to *Bifrontia*. [TROCHIDÆ.]

**OMAN**. [ARABIA.]

**OMAR I.** (Abū Hafṣah Ibn-al-Khattāb), successor of Abū Bekr, and second khalif of the Mussulmans, was the third cousin of Abdullah, the father of the prophet. The sworn enemy at first of Mohammed, whose life he attempted, and whose doctrines he opposed, he was converted to Islām in a manner apparently miraculous, and became one of Mohammed's most zealous and ardent followers; he accompanied him in all his military expeditions, and contributed by his experience and abilities to the success of his cause. [MOHAMMED.]

After the death of Abū Bekr (A.D. 634), whose *hadjeb*, or chamberlain, he was, Omar was sworn khalif according to the express wish of his predecessor. The first act of his administration was to remove from the command of the Syrian armies the celebrated Khāled Ibn Walid, surnamed 'The sword of God,' who by his rapacity and cruelty towards the vanquished had made himself obnoxious. Omar replaced him by Abū Obeidah Ibn-al-Jerrāh, another brave general who had distinguished himself in the wars against the Greeks; but Khāled had virtue enough to accept the second post in the army, and he continued to serve under the new general. These two commanders prosecuted the conquest of Syria, and took Damascus, its capital, in the month of Rejeb, A.H. 14 (August-September, A.D. 635).

After the capture of Damascus, the Moslems proceeded to the reduction of Emesa, Hamah, and Kennesrin. The emperor Heraclius sent a considerable force to stop the progress of the Arabs, but the Greeks were completely defeated at the bloody battle of Yermūk (636). The following year (637) Omar sent Amru Ibn-al-As and Sarjil to besiege Jerusalem. The city was stoutly defended by the garrison, but after a siege of several months the patriarch Sophronius, who commanded in it, agreed to surrender to the Moslems, but refused to treat with any other except the khalif himself. A messenger having been despatched to Omar, who was then residing at Medina, he hastened to Jerusalem followed by a scanty suite. Omar's journey from Arabia to Palestine has thus been described by the historian Tabari. 'He rode a sorrel-coloured camel, and was dressed in an old tattered habit of hair-cloth; he carried with him, in two bags, his provisions, consisting of dry fruits, barley, rice, and boiled corn, besides a skin for the water. Whenever he halted to make a repast, he permitted those who accompanied him to partake of it, eating from the same wooden dish: if he took any rest, the earth was his couch. During his march he administered justice to all applicants; in several instances he corrected the laxity of morals, and reformed several abuses, especially among the new converts; abolishing also many luxurious indulgences which had spread among the Moslems, such as the drinking of wine, the using of silken garments, &c. . . . Arrived at the camp, he caused several Moslems to be seized and dragged through the mud for having, in disobedience to his orders, arrayed themselves in the silken tunics of the conquered Greeks.' After a short conference with Sophronius, the terms of a capitulation were agreed upon, and the keys of the holy city were delivered up to Omar. The articles of the capitulation of Jerusalem have already been translated (*Mines de l'Orient*, vol. ii.), but as they were the model upon which the Moslems dictated many others to the subdued cities of Africa and Spain, we shall transcribe them here. 'The inhabitants shall retain their lives and property; they shall preserve the use of their churches, but they shall build no new ones; they shall neither place crosses upon those which they already have, nor hinder the Moslems from entering them night or day; they shall not ring their bells, but they shall be allowed to toll them; if a Moslem travels through the city, the inhabitants shall give him hospitality for three days. They shall not be enforced to teach their children the Korān, but they shall not try to convert any Moslem to their religion; they shall in every instance show respect for the Moslems, and give them the precedence; they shall wear turbans and shoes, and use names different from theirs. They shall be allowed to ride on horseback, but without either saddle or arms; they shall never go out without their girdles;\* they shall not sell wine to the Moslems,

and shall remain faithful to the khalif, and pay regularly the taxes imposed upon them.' Omar made his triumphant entry into Jerusalem towards the middle of the year 16 of the Hejira (A.D. 637). After conversing for awhile with Sophronius, and addressing to him several questions on the antiquities of the place, visiting the Church of the Resurrection, and saying his prayers under its portico, he desired to be conveyed to Bethlehem, where he also performed his devotions. Returning again to the city, he caused a magnificent mosque to be erected on the site of Solomon's temple, the same which still remains an object of great veneration to the Mussulmans. The taking of Jerusalem was followed by the reduction of all the principal cities of Palestine, while Khāled and Abū Obeidah made themselves masters of Laodicea, Antiochia, Aleppo, and Balbek.

Being master of Syria, Omar prepared to invade Persia, a kingdom then ruled by a king named Yezdejd, against which he had at the beginning of his reign unsuccessfully contended (634). Saad Ibn Abi Wakkāss, who was now entrusted with the command of the army, penetrated far into Persia, defeated at Kādesiyyah a powerful army commanded by Rustam, who fell in the battle, took possession of Bahr-Shīr, in the western quarter of the city of Madāyin, the ancient Ctesiphon, founded the city of Kūfah near the Euphrates (638), crossed the Tigris, and at last took Madāyin, the capital of Yezdejd's kingdom.

In the meanwhile Amru Ibn-al-As, who commanded the armies of Egypt, completed the conquest of that country by the reduction of Alexandria (640). It was then that the famous library founded by Ptolemy Philadelphus is said to have been destroyed by the conquerors. Upon an application from Amru to the khalif to know his pleasure concerning its contents, an answer was returned, commanding its destruction, 'for,' said Omar, 'if the books of the Greeks agree with the book of God (Korān), they are superfluous, and need not be preserved; and if they disagree, they are pernicious, and ought to be destroyed.' In consequence of this decision, we are told, and (notwithstanding all Gibbon's ingenuity to discredit the account) we are inclined to believe, that the manuscripts were delivered up to the four (others say five) thousand public baths in the city, to which they served as precious fuel for six months. [ALEXANDRIAN LIBRARY.]

The conquest of Egypt was followed by that of part of Africa. Amru pushed his victorious arms as far as the deserts of Tripoli and Barca. Armenia was in the meanwhile subdued by Mugheyrah (641), and Khorassān (642) by Ahnaf Ibn Kays, another of Omar's lieutenants. In the same year was fought the famous battle of Nehavend, which decided the fate of Persia. Firūz, who now commanded the armies of Yezdejd, was killed, and the monarch himself obliged to seek an asylum at Farghanah among the Turks, where he died soon after in poverty.

The success which attended the arms of Omar, his unflinching severity towards the vanquished who would not embrace the religion of the prophet, and, more than all, the inexorable justice which he dealt among his own people, excited against him numerous enemies at home and abroad, and several attempts were made upon his life. Iabalāh Ibn Ahyām, chief of the Arabian tribe of Ghosān, became one of his most implacable enemies. Although a tributary to the Greek emperor, in whose states he lived with his tribe, and though professing the Christian religion, Iabalāh went to see Omar at Medina, swore obedience to him, and embraced Islām with all his followers. Omar then took him with him on a pilgrimage to Mecca. While the neophyte was making as usual seven times the circuit of the Kaabah, an Arab of low extraction happened to run against him, and was the cause of the prince's cloak falling off his shoulders. Iabalāh resented the incivility by immediately striking the man a blow on the face. The man made his complaint to Omar, who, having summoned Iabalāh to his presence, sentenced him to receive a similar blow from the complainant. Against this sentence, just as it was, Iabalāh most warmly remonstrated, saying that he was a king among his own people, and that the offender deserved to be punished with death. 'My friend,' said Omar to him, 'the religion that thou and I follow makes no distinction between the king and the subject.' Rather than submit to the sentence, Iabalāh secretly left Mecca with all his suite abjured Islām, and sought the protection of the Greek emperor. He had moreover sworn to revenge the outr

\* The girdle was distinctive of all Christians then living under the Mohammedan sway.

Having communicated his plans to a resolute young slave of his, Wátheek Ibn Musáfer by name, he promised him his liberty, if he should succeed in killing Omar. Having arrived at Medina (638), where the khalif was then residing, Wátheek was informed that Omar was in the habit of sitting down every day under a tree on his way to the mosque. Wátheek, having climbed up the tree, awaited the arrival of Omar, who took his seat beneath it and fell asleep. Wátheek was upon the point of coming down for the purpose of stabbing Omar with his dagger, when, lifting up his eyes, he saw a lion walking round him and licking his feet. Nor did the lion cease to guard the khalif until he awoke, when the lion instantly went away. Wátheek was so much struck by this circumstance, that he came down, kissed the khalif's hand, confessed his intended crime, and embraced the Mohammedan religion.

The life of Omar however was at length ended by assassination. A Persian slave of the Magian sect, whose name was Abú Lúlú Firúz, had been obliged by his master Al-mugheyrá Ibn As-shaabah to pay him two dirhems daily, in conformity with the Mohammedan custom, for the free exercise of his religion. Firúz, resenting this treatment, brought a complaint before the khalif, and requested that some part at least of the tribute exacted of him might be remitted; but this favour being refused by Omar, the Persian swore his destruction, and some days afterwards, while Omar was performing his morning devotions in the mosque at Medina, he stabbed him thrice in the belly with a sharp dagger. The people fell upon the assassin, but he made so desperate a defence, that although he was armed with no other weapon than his dagger, he wounded thirteen of the assailants, and seven of them mortally. At last one of the khalif's attendants threw his cloak over his head and seized him; upon which he stabbed himself, and soon after expired.

Omar languished five days. He died on a Friday, in the month of Dhul-l-hajjah, A.H. 23, answering to the month of November, A.D. 644. He was buried on the following Saturday, close to the prophet and Abú Bekr, in a mosque which he had founded at Medina, where his tomb is still visited with great respect by the Mussulmans. Having been asked, some time before his death, to name his successor, he refused; and upon the suggestion of one of his courtiers that he should leave the khalifate to his son Abdullah, he remarked, 'It is enough that one out of my family has been forced to bear this burden, and account afterwards to his God for the command and government of the faithful.'

Omar was sixty-three years old when he died. Authors are at variance as to the duration of his khalifate: the best-informed historians however say that he reigned between ten and eleven years. Abú-l-fedá (*An. Mosl.*, tom. i., p. 251) says ten years, six months, and eight days. Omar was tall; he had a clear complexion; his head was bald. Mohammedanism cannot boast of a more virtuous sovereign or a more zealous apostle. It has been said of him that he contributed more efficaciously to the advancement of the Mohammedan religion than the prophet himself. Khondemir, the celebrated Persian historian, thus recapitulates the praiseworthy acts of this khalif:—'He took from the infidels 36,000 cities or castles, destroyed 4000 temples or churches, and founded or endowed 1400 mosques.' The prophet had the greatest esteem for Omar, whose daughter Háfssah he married. On a certain occasion he was heard to say, 'If God had wished to send a second messenger to this world, his choice would undoubtedly have fallen on Omar.' The devotion, humility, and abstinence of this khalif have become proverbial among the Mussulmans. He never tasted any other food than barley-bread and dates; water was his only drink; and he was often found asleep under the porch of a mosque or beneath a tree. He complied most strictly with all the precepts of the Korán. Eutychius tells us that during his khalifate he performed nine times the pilgrimage to Mecca. In order better to conform to the regulations of the Korán, he lived by the work of his hands, supporting himself entirely by the sale of leather belts which he manufactured. But the quality for which Omar was most conspicuous was justice, which he is said to have administered with an even hand to infidels as well as believers. The historian Wakedí says that the staff of Omar was more dreaded than the sword of his successors. In the lifetime of Mohammed, a Moslem, condemned for his iniquitous treatment of a Jew, happening to appeal to Omar from the sentence of the prophet, he immediately cut him down with his scymitar for not acquiescing in

the sentence of so upright a judge. From this circumstance Mohammed gave Omar the surname of Al-fá, which he retained ever afterwards, a word meaning the divider, or the discriminator, thus doubly alluding to his action and the discernment which prompted it. Some of the best Mohammedan institutions date from the reign of Omar. It was in his time that the era of the Hejira, or flight of Mohammed, by which all Mohammedans compute their years, was established, and its beginning fixed on the 16th day of July, A.D. 622. He was the first who kept armies under pay, and assigned pensions to officers out of the public revenue: he instituted a police force to watch at night for the security of the citizens; and he promulgated some excellent regulations respecting the duties of masters towards their slaves. He was also the first who assumed the title of Amír-al-mumín (commander of the faithful) instead of that of Khalífat-rasúli-l-lahi (vicar of the messenger of God), which his predecessor Abú Bekr had used. Omar's memory is the object of the greatest veneration among Mussulmans of the Sunni, or orthodox sect; not so among the Shiites, or partisans of Ali, who look upon the three first khalifs, Abú Bekr, Omar, and Othmán, as usurpers of the khalifate, to the prejudice of Ali, to whom, they pretend, it belonged as the nearest relative of the prophet.

(Abú-l-fedá, *Annales Moslemici*, translated by B. Hafnæ, 1790, tom. i., fol. 250, et seq.; Al-makín, *Historia Saracénica*, apud Erpenium, Ludg. Batav., 1623, p. 251, et seq.; *Raudhatul-manádhir*, by Ibn Shihnah, MS.; *History of the Saracens*, by Simon Ockley, p. 300; Ibn Khattib, *Historia Calipharum*, apud Casiri; *Bib. Ar. Lib. Esc.*, vol. ii., p. 177, et seq.; D'Herbelot, *Bib. Or.*, in voc. *Ben al-Khattab*, *Khaled*, *Damashk*, *Iskandriah*, et al.; Gibbon, *Decline and Fall*, vol. ix., p. 222; &c.)

OMAR II. (Abú Háfss), the eighth khalif of the family of Umeyyah who reigned in the East, was the son of Abd-al-aziz, and the nephew of Abd-al-malek. He succeeded his cousin Suleymán, in the month of Safar, A.H. 99 (Sept. A.D. 717). This khalif, who on his mother's (Umm-Asseel) side was the great-grandson of the first Omar, imitated in every respect the conduct and the virtues of his illustrious ancestor. He was simple, modest, and frugal; he loved justice so much as to sacrifice to it his own interests and those of his family. He was religious and devout, and his mind was always occupied with the idea of a future world. One of the first acts of his administration was to suppress the maledictions which, since the time and by the order of Muawiyah, the first khalif of his family, had been read in all the mosques against the partisans and descendants of Ali: he also restored to the latter the lands which the prophet had given to Ali, and decreed that the produce should be equally divided among their posterity. These and other acts of justice towards the proscribed race raised alarm among the members and partisans of the family of Umeyyah, and especially Yezid, his cousin and successor. They feared lest Omar, carried away by his love of justice and his respect for the family of the prophet, should appoint a grandson of Ali to succeed him in the empire, and they decided to get rid of him. This they accomplished by administering to him a slow poison, from the effect of which he died at Hásserah, in Syria, in the month of Rejeb, A.H. 101 (Jan., A.D. 720), after a reign of two years and five months, in the forty-first year of his age. Omar had been extremely economical in his person and household, but his excessive liberality exhausted all his revenues; and at his death there was not in the royal coffers a sum sufficient to cover the expenses of his funeral.

(Abú-l-fedá, *Annales Moslemici*, vol. i., p. 267, et seq.; Al-makín, *Historia Saracénica*, p. 75, et seq.; Abú-l-fará, *Historia Dynastiarum*, transl. by Pococke, edit. nov., p. 136, et seq.; Ockley, *History of the Saracens*, p. 244.)

OMAR, IBN AL-AFTAS AL-MUTAWAKEL ALA-ILLAH (he who trusts in God), was the fourth and last sovereign of the dynasty of Beni Al-aftas, who reigned in the west of the Peninsula from A.H. 408 to 487 (A.D. 1017-1094). After the death of his brother Yahya Al-mansur (A.D. 1082), Omar succeeded him in a kingdom which extended over the greatest part of Extremadura and Portugal, and the capital of which was the city of Badajoz. At that time the once powerful empire of the Beni Umeyyah had vanished, and Mohammedan Spain was divided into sundry petty kingdoms, whose rulers were continually waging war against one another. [Moors.] One of the most active

and enterprising of these petty monarchs was Omar, who seems to have possessed all the qualifications of a good Eastern monarch—invincible courage, mild but impartial justice, and liberality touching upon prodigality towards the learned. Soon after his accession to the throne, hearing that Alfonso VII. was besieging Yahya, king of Toledo, in his capital, he sent his son Fadhl to his assistance with a considerable force; but after several sharp encounters, in which he lost the best of his men, Fadhl was obliged to retreat, and Toledo surrendered to the Christian king on the 25th May, A.D. 1085. The taking of that important capital, the rapidity with which Alfonso followed up his conquests, and, more than all, his declaration that he would not lay down arms until he had conquered the whole of Mohammedan Spain, threw alarm among the Moorish kings. After a meeting held at Cordova (A.D. 1086) as to the best means of humbling the pride and checking the power of Alfonso, it was agreed that Omar should write a letter, in the name of the other kings, to Yûsuf Ibn Tâshefin, the Almoravide sultan of Morocco, and implore the help of his arms against the formidable Christian. Yûsuf, who was seeking for a pretext to leave his native deserts and settle with his ferocious bands in the fertile valleys of Andalusia, immediately seized on the opportunity offered him; and, crossing the strait, landed on the coast of Spain, in August, A.D. 1086. [ALMORAVIDES.] Omar and the other kings of Mohammedan Spain hastened to join the Africans with their best troops; and four months afterwards (December, A.D. 1086) was fought, not far from Badajoz, at a place called Zalaca, one of the most strongly-contested and most sanguinary battles on record. The flower of the Spanish chivalry remained on the field. Alfonso himself was severely wounded in the thigh, by the hand, as it is asserted, of Omar Ibn Al-aftas. Elated with success, the African conqueror soon turned his arms against those of his own faith, and the brave Omar became one of his first victims. After defending for some time his kingdom against the superior forces of his adversary, commanded by Seyr Ibn Abî Bekr, Omar was obliged to shut himself up in his capital, where he still held out for a considerable time. The inhabitants having at last obliged him to capitulate, Omar surrendered the city on condition that his life and property should be preserved. The African general agreed to the terms: but scarcely had Omar left Badajoz, with his family and a few faithful servants, when a body of cavalry, sent by Seyr, overtook them, and they were all put to death (Feb., A.D. 1090). This lamentable catastrophe has been recorded in a beautiful elegiac poem by an Arabian poet named Ibn Abdûn. The poem is in the Bodleian Library at Oxford.

(Abû-l-fedû, *Annales Moslemici*, vol. iii.; Casiri, *Bib. Ar. Hisp. Esc.*, vol. ii., p. 178, et seq.; Conde, *Hist. de la Dom.*, vol. ii.; Cardonne, *Hist. de l'Afrique*, vol. ii.)

OMAR, IBN HAFSSU'N, a famous rebel who long defied all the power of the sultans of Cordova, was born at Ronda, of Christian parents, towards the middle of the third century of the Hejira. He was at first a tailor, but finding his profession beneath him, he repaired to Truxillo, a town in Extremadura, and enlisted himself as a soldier. We next hear of him as a captain of banditti in the hills of Andalusia, where he long baffled the pursuit of justice, and defeated all the troops sent for his apprehension. Some time afterwards, scorning his narrow limits, he went to the frontiers of Navarre, seized on a mountain fortress, and thence extended his ravages into Aragon. He appears to have soon subjected the neighbouring country. As his forces increased, he assumed the tone of a sovereign, excited the inhabitants to revolt against the sultans of Cordova, and made even an offensive and defensive alliance with Ordoño II., king of Asturias and Leon. Profiting by the internal troubles which at that time (A.D. 859) agitated the kingdom of Cordova [Moors], then in the hands of a warlike but unfortunate prince, Mohammed I., this daring rebel, at the head of a powerful army, composed of Mohammedans and Christians, began to ravage the richest provinces of the empire, and to commit all manner of depredations, defeating in every encounter the royal armies sent against him. As might be expected, his success brought all the discontented under his standard: Abd-al-malek, the governor of Lerida, openly embraced his cause, and the example was followed by other local governors. Mohammed advanced to chastise the rebel at the head of his best troops (A.D. 866); but Omar, who had as much cunning as courage, seeing that he

could not contend against the royal forces, had recourse to the following stratagem. By his messengers he persuaded Mohammed that his only object was to deceive their common enemies, the Christians, in order better to turn his arms against them: that he was still a true Mussulman, and a loyal subject. Mohammed praised him for his policy, promised him ample reward if he succeeded in his enterprise, and actually sent his own nephew, Zeyd Ibn Kâsim, with a body of cavalry to strengthen Omar (A.D. 866); but no sooner had the prince and his followers reached the camp, than they were barbarously butchered by their treacherous allies. On receiving the news of this catastrophe, Mohammed swore to be revenged: he ordered his eldest son, Al-mundhir, to take the field against the rebels, enjoining him never to appear again in his presence unless he had completely crushed the perfidious outlaw. Al-mundhir sought Omar, who awaited his arrival without fear. In the bloody battle that ensued (A.D. 867) the rebels were cut to pieces, and their chief was obliged to seek refuge among the fastnesses of the Pyrenees. But Omar had too much spirit to be put down by one reverse, although he could scarcely depend on a few score of followers: he offered his services to the Navarrese, gained for them many fortresses, and received from them the title of king. The governors of Saragossa and Huesca having taken the field against him, he defeated their united forces, and conquered the whole country as far as the Ebro. This time the sultan Mohammed in person, accompanied by his son Al-mundhir, marched against the rebel. Omar endeavoured by light skirmishing to prevent a general engagement, but he was unsuccessful; and after a most bloody conflict, in which he himself was dangerously wounded, his army was completely defeated at Aybar, on the frontier of Navarre and Aragon, in A.D. 882. Omar contrived to escape from the field of battle, but he died the ensuing year from his wounds. He left a son, named Kâleb, who inherited his courage, and who, more fortunate than his father, remained in undisturbed possession of Eastern Spain, where he had founded a kingdom, until he was ultimately put down by Abd-al-rahman III., in A.D. 919. Omar and his son Kâleb have been often confounded by Cardonne and Casiri; and hence the error committed by M. de Sacy (*Biographie Universelle*, in voc. *Omar Ben Hafssoun*), who made one out of the two individuals.

(Conde, *Historia de la Dominacion de los Arabes en España*, vol. i., p. 294 et seq.; Casiri, *Bib. Ar. Hisp. Esc.*, vol. ii., pp. 34, 47, 108, et passim; Cardonne, *Hist. de l'Afr. et de l'Esp.*, vol. i., p. 289 et seq.; Roderici Toletani *Historia Arabum ad calcem Erpenii Historiæ Saracenicae*, Lugd., Bat., 1625.)

OMAR, an eminent physician and mathematician, whose complete name and titles are Omar Ben Abderrahman Ben Ali Abulhakem Al-Kermani (the Carmanian, probably so called from his family having been originally natives of the province of Kerman, or Carmania, a country on the south-east of Persia). He was born at Cordova, A.H. 368 (A.D. 990), and travelled into the East for the purpose of improving himself in geometry and medicine. On his return to Spain he settled at Saragossa, where he died, at the age of ninety, A.H. 458 (A.D. 1080). He was particularly famous for his skill in performing surgical operations, but left no works behind him either on medicine or mathematics.

(*Arab. Philosoph. Biblioth.*, in Casiri, *Biblioth. Arabico-Hisp. Escorial*, tom. i., p. 436.)

OMAR, BEN-AHMED BEN-CHALDUN ABU MOSLEM AL-HADHRAMI, was probably born (as his name would seem to imply) in Hadrhamaut, a province of Arabia. He gave his chief attention to geometry, astronomy, and medicine, in all of which branches of science he acquired great fame, and was no less eminent for his moral character than for his philosophical attainments. He died A.H. 449 (A.D. 1071), at Seville, in Spain, where he had been for some time settled.

(*Arab. Philosoph. Biblioth.*, loco citato.)

OMAYYADES, or Umayyades. [Moors.]

OMBI. [Egypt.]

OMEN, a sign or prognostication of future events, supposed to be an intimation from a superior power. According to Varro (*De Ling. Lat.*, lib. v., c. 7), the word is derived from the language of a person speaking; 'Omen, quod ex ore primum elatum est, nomen dictum,' which was also the opinion of Cicero (*De Divin.*, i., c. 45), who says, 'Nec solum Deorum voces Pythagoræi observitaverunt, sed et'



hominum, quæ vocant *omina*' (the Pythagoreans attended to the words not only of gods but also of men, which they called omens). The term afterwards comprehended all signs of future events.

In all probability there is no nation that has not at some time entertained a belief in omens. We find traces of it in the Scriptures. Among the Greeks and Romans it was general. The Persians, the Arabians, the Scandinavians, the Germans, the Icelanders, the ancient Britons, and the early Christians, were all imbued with this superstition.

Many curious instances of Roman superstition with reference to omens are enumerated in Pliny (xxxviii. 2). The unlucky omens which preceded the battle of Cannæ are enumerated by Silius Italicus, lib. viii., v. 626, &c.; see also Lucan, i., v. 522, &c. Pausanias (iv. 13) enumerates the omens which announced the fate of the Messenians in their struggle with the Lacedæmonians. Suetonius (*Jul.*, § 59) says that Cæsar, in landing at Adrumetum in Africa with his army, happened to fall on his face, which was reckoned a bad omen; but, with great presence of mind, he laid hold of the ground with his right hand, and kissing it as if he had fallen on purpose, he exclaimed, 'Teneo te, Africa' (I take possession of thee, O Africa).

A superstitious regard to omens in our own country formerly made a considerable addition to the stock of human misery. Generally speaking, we now look back with indifference on the trivial and ridiculous accidents which alternately afforded matter of joy or sorrow to our ancestors. Nevertheless, in remote parts of the kingdom, a superstitious regard to omens still exists.

Wythers, in his 'Abuses stript and whipt,' 8vo., Lond., 1613, p. 167, says:—

'For worthless matters some are wondrous sad,  
Whom if I call not vaine, I must term mad.  
If that their noses bleed some certain drops,  
And then againe upon the suddaine stops,  
Or, if the babling fowl we call a Jay,  
A Squirrel, or a Hare but crosse their way,  
Or if the salt fall toward them at table,  
Or any such like superstitious bable,  
Their mirth is spoild because they hold it true  
That some mischance must thereupon ensue.'

Dryden and Lee's 'Œdipus,' act iv., sc. 1, also satirises this superstition:

'For when we think fate hovers o'er our heads,  
Our apprehensions shoot beyond all bounds,  
Owls, ravens, crickets, seem the watch of death;  
Nature's worst vermin scare her g-dlike sons;  
Echoes, the very leavings of a voice,  
Grow babling ghosts, and call us to our graves  
Each mole-hill thought swells to a huge Olympus,  
While we, fantastic dreamers, heave and puff,  
And sweat with an imagination's weight;  
As if, like Atlas, with these mortal shoulders  
We could sustain the burthen of the world.'

Butler frequently alludes to omens in his 'Hudibras;' and by no writer have they been more successfully ridiculed than by Gay in his fable of the 'Farmer's Wife and the Raven.'

Dr. Hickes, in a Letter to Dr. Arthur Charlett, Master of University College, Oxford, dated January 23, 1711, preserved in the Bodleian Library, mentions 'the omens that happened at the coronation of King James II., which,' says he, 'I saw: viz., the tottering of the crown upon his head; the broken canopy over it; and the rent flag hanging upon the White Tower when I came home from the coronation. It was torn by the wind at the same time the signal was given to the Tower that he was crowned. I put no great stress upon these omens, but I cannot despise them; most of them, I believe, come by chance, but some from superior intellectual agents, especially those which regard the fate of kings and nations.'

Aubrey, in his 'Miscellanies,' 8vo., Lond., 2nd edit., p. 37-46, devotes a section to Omens.

**OMENTUM** is a broad band of membrane connecting two or more of the abdominal viscera. The chief of these membranes is the great omentum, or caul, which forms a large fold connecting the stomach with the transverse arch of the colon; others of less size and importance connect the stomach and liver, and the stomach and spleen. The great omentum always contains some fat surrounding its blood-vessels, so that it looks like a network of fatty tissue, and it is one of the chief seats of the accumulation of fat in corpulent persons, in whom it contributes largely to the peculiar prominence of the abdomen.

**OMER, ST.**, a town in France, capital of an arrondissement in the department of Pas de Calais, 130 miles north of Paris in a direct line, or 138 miles by the road through

Beauvais, Abbeville, and Hesdin, in 50° 45' N. lat. 2° 14' E. long.

This town was antiently a village, with a castle called Sitié; the sea is said then to have flowed up to the port. It was fortified with walls about the close of the ninth century, about which time it began to bear the name of patron saint, Audomare, or Omer, bishop of Therouanne. It was included in the county of Flanders, and was among the possessions of the ducal house of Bourgogne, from which it was inherited by the Spanish branch of the Austrian family. The emperor Charles V. strengthened the fortifications; and in the sixteenth century the bishop's see was transferred hither from Therouanne. St. Omer was taken by the French in 1677, and confirmed to them the following year by the peace of Nimeguen. It was one of the places chosen by Napoleon for building his flotilla for the invasion of England. Part of the English contingent of the army of occupation encamped near the town in 1816. The diocese was suppressed at the Revolution.

St. Omer is a fortress of the first class; it is surrounded by fortifications between two and three miles in circuit, constructed of red bricks. It is strengthened by four forts and by entrenchments, and further protected by marshes, which can easily be flooded. There are four gates, of which only two will admit carriages. The town is traversed and surrounded by different branches of the canal of the Aa, and the canal of St. Omer, which unites the Aa and the Laas. The principal streets are broad, but there is only one square. The houses are chiefly built of yellow or green bricks, except some of the public buildings, which are red bricks. There is a town-hall, forming one side of the square. There are four churches, two parochial and two subsidiary; two of the churches are fine Gothic buildings that formerly attached to the abbey of St. Bertin in the forest, but was, in 1814, falling to ruin. The ex-cathedral is smaller than the church of St. Bertin, but in better preservation. The front of the church of the collège, or high-school, is surmounted by two towers. The ramparts, which are planted with elm trees, the quays on the banks of the canal, and the Calais road, are used as public walks. There are many fountains.

The town formerly depended for support on the expenditure of the troops in garrison and of the great number of monks and other members of the religious orders. There were formerly twenty-five or twenty-six convents, including the abbey of St. Bertin, one of the richest and most famous of the Benedictine order in France, where Childéric III., the last of the Merovingian kings, was confined after his deposition, and where he died. There were also a seminary for the priesthood, and a celebrated English college for the education of young Roman Catholics of England and Ireland. The building formerly occupied by this college is now converted into a military hospital. The inhabitants of St. Omer amounted, in 1831, to 19,344; in 1836, to 19,032. They are engaged in the manufacture of candles, soap, starch, glue, woollen cloth, blankets, fishing-nets, cord, linen thread, leather, and wire wares, of which last a considerable quantity is exported. There are refining-houses for salt, dye-houses, breweries, distilleries, potteries, oil-mills, and some other industrial establishments. Trade is carried on in corn, wine, flax, oil, and coal. There are two considerable fairs in the year. There are in the town an Ursuline convent, a house of the Sœurs de la Charité, an hospital for orphans and foundlings, a military hospital, another hospital, two almshouses, a high school, to which is attached a public library of from 16,000 to 20,000 volumes, a school of drawing and architecture, a theatre, public baths, an arsenal, four powder-magazines, and three prisons. The canals and roads, which converge at the town and communicate with Abbeville, Boulogne, Calais, Dunkerque, and other places, promote its commercial and general prosperity.

North of the town are two suburbs: Haut Pont, extensive and well-built, on the banks of the Aa; and Lize, the inhabitants of which are of Flemish origin, and preserve their language. They are mostly gardeners, and cultivate the marshes which were drained by their forefathers. This drainage is effected by means of ditches so numerous as to form a complete labyrinth, and to insulate almost every single field or garden. Each proprietor keeps his boat, by which alone he can reach the land which he cultivates; and in which he conveys part of his family, his gardening tools, and his produce. Vegetables, especially cauliflowers, are

cultivated rather than corn. The soil is remarkable for its fertility. The canals or pools of this marshy tract formerly contained many floating islands, of a few feet diameter, covered with grass and shrubs, which were regarded as objects of great curiosity; from neglect most of them have become attached to the bank or to the bottom of the ditches. Peat is dug in these marshes. The environs of St. Omer are fertile in corn, colza, flax and hemp, and afford excellent pasturage.

The arrondissement of St. Omer comprehends an area of 419 square miles, and includes 117 communes. It is subdivided into seven cantons, or districts, each under a justice of the peace. The population, in 1831, was 103,073; in 1836, it was 105,020.

OMERCUNTUC. [HINDUSTAN, vol. xii., p. 205.]

OMMIADÉ, or UMEYYAH DYNASTY. [MOORS.]

O'MNIBUS, a long-bodied coach or carriage, calculated to afford side-seats in the interior to twelve or fourteen persons. It was originated in Paris, in the year 1827, and derives its name from the last word of the inscription placed upon the sides of the earliest of those vehicles, namely, *Entreprise générale des OMNIBUS*. In the latter part of 1831 and beginning of 1832, omnibus carriages began to ply in the streets of London. Those from Paddington to the Bank were the earliest. Carriages of similar form were used in England as long stages more than forty years ago, but not answering the expectations of the proprietors in point of profit, they were soon laid down. Omnibuses began to run in Amsterdam in September, 1839.

OMSK. [SIBERIA.]

ON. [EGYPT.]

ONAGGA, or DAUW, names of the *Equus montanus* of Burchell. [HORSE, vol. xii., p. 314.]

ONAGRA'CEÆ. Under this name is comprehended a group of polypetalous exogenous plants, which, in their more complete condition, are certainly known by their inferior ovary, and by all the parts of the flower being four, or a constant multiple of that number. Thus in the plant now figured (*Jussiaea grandiflora*) there are four sepals, four petals, twice four stamens, four stigmas, four cells to the ovary, and the fruit when ripe bursts into four valves. The species characterised by this peculiarity are chiefly herbaceous plants, inhabiting the more temperate parts of the world, and have white, yellow, or red flowers, such, for example, as the great genus of *Crothoras*, or Evening primroses, and the *Epilobiums*, which are so common as wild plants. It is only in the *Fuchsia*, which has a succulent fruit, and forms an approach to *Myrtacæ*, that a woody structure is met with.



*Jussiaea grandiflora*.

1, a fruit nearly ripe, and surmounted by its four sepals; 2, a transverse section of the same, to show the four cells.

But although genuine Onagraceæ are thus plainly limited, botanists admit into the order other plants which do not possess the character proper to the order, and which are regarded as imperfect states of it. Thus *Hippuris*, which has only one stamen, no petals, and a one-celled ovary, is re-

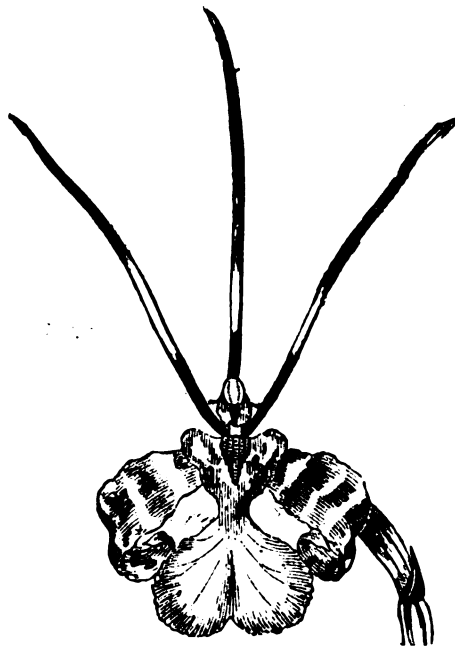
garded as a case of degradation from the Onagraceous type; and *Lopezia*, with only one perfect stamen, one imperfect stamen, and two petals, is considered another but less degraded condition of the order. (De Candolle's *Prodromus*, vol. iii., p. 35.)

A large proportion of Onagraceous plants are ornamental, and consist of common garden flowers, especially the species *Crothera*, *Godetia*, *Epilobium*, and *Fuchsia*; but none of them possess any useful quality worth recording.

ONCHI'DIUM. [CYCLOBRANCHIATA, vol. viii., p. 249; LIMACIDÆ, vol. xiii., p. 486.]

ONCHIDO'RIS. [CYCLOBRANCHIATA, vol. viii., p. 249.]

ONCI'DIUM is a very large genus of tropical and subtropical Orchidaceæ, found in the western hemisphere, where the species are common, especially in Mexico and some of the West Indian islands, Brazil, and Peru. They have usually yellow flowers spotted with a rich reddish-brown: sometimes the blossoms are purple, and more rarely white. They belong to the Vandaceous section of their order [ORCHIDACEÆ], and are known by their labellum being broad, more or less lobed, distinct from the column, and furnished at the base with a tuberculated disk, which usually presents some grotesque appearance. Their sepals and petals are spreading, their column has a membranous ear on each side, and they have two pollen masses attached to a long caudicula. The most remarkable species is the Butterfly-plant, so called in consequence of the supposed resemblance of its flowers to some insect upon the wing. This is found in Trinidad, growing on the branches of trees, and bears a long, jointed, compressed, spotted scape, from the apex of which swings lightly a large yellow and brown flower, whose labellum is compared to the body of an insect, the column to its head, a pair of processes arising from the column to short antennæ, and the long narrow sepals and petals to legs. It is now common in bothouses.



*Oncidium Papilio*, or Butterfly Plant.

ONDA'TRA. [MUSQUASH]

ONEGA, Lake. [RUSSIA.]

ONEGLIA, a province and town of the Sardinian States in the western Riviera of Genoa, between the provinces of San Remo on the south-west and Albenza on the north-east. The Apennines bound it to the north, and separate it from the valley of the Tanaro in Piedmont. The province of Oneglia consists of several valleys sloping from the foot of the Apennines to the sea, and watered by mountain torrents. The principal stream, called the Impero, flows by the walls of Oneglia. The chief produce of the country is oil, of which 100,000 barrels are exported annually, partly by sea and partly by land, to Piedmont and Lombardy. The average price of each barrel on the spot is about two pounds sterling. The population of the province is 52,770, distributed into 67 communes.

1. Oneglia, where the authorities reside, is a town of

5400 inhabitants: it has a fine collegiate church, and a college kept by the fathers Scholarum Piarum. Oneglia is the birthplace of the celebrated naval commander and statesman Andrea Doria. In 1792 the French admiral Truguet appeared with his fleet before Oneglia, and sent a boat to summon the town to surrender, France being then at war with the king of Sardinia. The few soldiers in the town fired upon the boat, and killed some sailors and wounded the officer in charge of the boat. Upon this Truguet began a furious cannonade upon the town and almost entirely destroyed it. The people ran away to the mountains. The town has been since rebuilt, and it carries on some trade by sea. 2. Porto Maurizio, a few miles south-west of Oneglia, a busy thriving seafaring town, has a small harbour for boats and a roadstead for larger vessels: it contains nearly 7000 inhabitants, many fine houses, a handsome collegiate church, and several other churches with good paintings of the Genoese school. The surrounding hills and valleys are planted with olive-trees and studded with country-houses. 3. Diano, which is divided between Diano Castello, or Upper Diano, and Diano Marina, or the lower town, contains altogether about 9000 inhabitants, distributed in several villages or communes. The valley of Diano is one of the most fertile districts of the Riviera of Genoa. It produces oil and good wine. A great part of the population are sailors.

Oneglia was formerly a feudal principality, and once belonged to the family of Doria, who sold it in 1576 to Emmanuel Philibert, duke of Savoy and prince of Piedmont. From that time it remained subject to the House of Savoy, until the French occupation in consequence of the wars of the Revolution. At the Restoration it was formed into a province with the neighbouring Genoese district of Porto Maurizio. A new road leads from Oneglia over a pass in the Apennines, about 3000 feet high, to Ormea in the valley of the Tanaro in Piedmont.

(Serristori, *Statistica dell' Italia*; Bertolotti, *Viaggio nella Liguria Marittima*.)

ONEIDA. [NEW YORK.]

ONGAR. [ESSEX.]

ONION. The species from which the varieties of the common onion have been derived is the *Allium Cepe*. Its uses are almost universally known, and its cultivation is practised in most countries. The range of latitude within which it may be grown extends from the tropics almost to the coldest verge of the temperate zone. Its leaves and roots are of an annual nature, inasmuch as they die in the course of a single summer, after perfecting a bulb; the latter however is biennial, and capable of putting forth fresh roots and leaves in the following season, and of acquiring an increase in its size. This property is taken advantage of in one of the modes of cultivation.

The following are the principal varieties:—

*Early Silver-skinned*—valuable only on account of its carlinness.

*Silver-skinned*—moderately large, flat, shining, white, mild.

*Portugal*—large, oblate, imported largely from the country of which it bears the name, but only adapted for a supply during the early part of winter: quality rather mild.

*Tripoli*—the largest of all the varieties: oval, or somewhat flattened, light red, mild, but does not keep long.

*Spanish, or Reading*—large, flat, white, mild; resembles the Portugal onion, but is better adapted for cultivation in this climate.

*Strasbourg*—large, flat or globular, light red tinged with green, strong-flavoured, and keeps well.

*Deptford and Globe*—are subvarieties of the preceding, of milder quality, and yield generally good crops.

*James's Keeping*—large, pyriform, brownish-red; keeps remarkably well; flavour strong.

*Blood-red*—middle-sized, flat, deep red; keeps well, but of the strongest flavour, on which account it is medicinally preferred to the other varieties.

*Yellow or Straw-coloured (Oignon paille ou jaune of the French)*—small, globular, firm, valuable for pickling.

*Two-bladed*—small, roundish, green, with little foliage.

*Potato or Under-ground Onion*.—This peculiar variety forms numerous bulbs below the surface, which attain maturity early in the summer.

*Tree or Bulb-bearing Onion*—bears, instead of flowers, small bulbs, which are only useful for pickling.

Onions will succeed in any good rich soil, provided it be

neither too wet and adhesive, nor, on the other hand, too dry and light. They may even be grown successively on the same spot for a number of years, contrary to what happens with the majority of crops. Abundance of well-prepared manure should be thoroughly incorporated in digging the soil. The dung of pigeons and poultry is used with advantage; and some, particularly the French gardeners, prefer sheep-dung.

The time of sowing the general crop is from the middle of February to the middle of March, according to the state of the ground and of the weather. The seeds may be sown broadcast or in very shallow drills: the latter mode admits of the ground being more easily stirred on the surface and kept clean. In either case the seeds should be covered as lightly as possible.

When the leaves indicate, by the general yellowness of their points, that their office has been performed, the necks should be bent, and the bulbs pulled up soon after, and spread so that their fibres and stems may dry and wither in the sun. They may then be stored up in any dry and airy situation.

Very large onions may be obtained by sowing thickly in April on poor soil, so that the produce in the first summer may be of small size. The crop is then taken up as above directed, and the smallest and firmest are selected for planting in rich and well-prepared soil in the following spring.

Onions intended for pickling should be sown thickly on poor and dry soil. The silver-skinned, yellow, and two-bladed onions are the best varieties for this purpose.

For a supply of young onions in spring, the sowing should be made in August. Onions are sometimes attacked by a grub at the root. Trenching the soil to a good depth, soot, charcoal-dust, and lime-water, have severally been successfully applied as remedies.

ONISCHIA. [ENTOMOSTOMATA, vol. ix., p. 456.]

ONKELOS was the author of the most celebrated of the Targums, or Chaldee paraphrases of the Old Testament [TARGUMS.] The age at which he lived cannot be determined with any certainty. Jahn concludes from his style that he wrote not later than the second or third century. The Babylonian Talmud states that he was contemporary with Gamaliel; this would place him about the time of Christ. From the mention made of him by the *Babylonish* Talmud, and from the purity of his language, which is much better Chaldee than that used in Palestine, and approaches more nearly than any other extant specimen of the language to the Chaldee in *Daniel* and *Ezra*, Eichhorn supposes that he was a native of Babylon. His Targum contains the Pentateuch only. It is a faithful version, and corresponds so exactly with the Hebrew text, that it used to be chanted to the same notes, alternately with the Hebrew, in the Jewish synagogues, down to the beginning of the sixteenth century. This Targum is not mentioned by Origen or Jerome, which may perhaps be accounted for by the circumstance that Origen did not know Chaldee, and that Jerome only learnt it late in life. The Targum of Onkelos is printed in the Antwerp and Complutensian Polyglots, in Buxtorf's Hebrew Bible, and in Walton's Polyglott. It has been published separately at various times. The edition which has been generally followed is that of Venice, 1515, and 1525-6. It has been translated into Latin by Alfonso de Zamora, Paulus Fagius, Bernardinus Baldus, and Andrew de Leon of Zamora.

(Prideaux's *Connection*, pt. ii., bk. viii., p. 757; Horne's *Introduction*, vol. ii., p. 199; Jahn, *Introd. in Lib. Sac. Vet. Fœd.*, p. 59; Winer, *De Onkeloso ejusque Paraphrasi Chaldaica Dissertatio*, 4to., Lips., 1820.)

ONOMATOPE'IA (ὀνοματοποιΐα, ὀνοματωποιήσις), which literally means 'the making of words,' is the name given to those words which are formed, or supposed to be formed, by an imitation of natural sounds. Thus, the words 'to neigh,' 'to murmur,' 'to bleat,' 'to creak,' and many others are supposed to be merely imitations of natural sounds; but the number of such words has been greatly exaggerated by some grammarians. Aristophanes imitates the croaking of the frogs by βρεκεκεκε κεαε κεαε (*Frogs*, l. 209), and Ennius the sound of the trumpet by the word *taratantara*. (Servius on *Æn.*, ix. 503.)

ONTARIO, LAKE. [CANADA.]

ONYCHOTEUTHIS. [TEUTHIDÆ.]

ONYCHOTHE'RUM, Fischer's name for the *Megalyonx Jeffersonii*. [MEGATHERIIDÆ, vol. xv., p. 68.]

ONYX. [QUARTZ.]

**OODIPOOR.** [HINDUSTAN, vol. xii, p. 214.]

**OOJEIN** (*Ujjayini*), a principality in the province of alwa, subject to Junkojee Scindia, situated on the right bank of the Sippa river, near to the south-western extremity of the province. The soil is very fertile, producing ordinary seasons abundant harvests: but when the season more than usually rainy, the ground is rendered so soft to impede the operations of agriculture; and on the other hand, if the season should prove dry, the people are reduced to great extremity owing to the absence of wells and all other means for irrigating the lands. The town of Oojein is situated in 23° 11' N. lat. and 75° 46' E. long. Until the transfer of the seat of government to Gualior, Oojein was the capital of the Scindia Mahrattas; it was once a large and populous city six miles in circumference, the whole area being occupied with buildings, but many of the inhabitants have been drawn away since the departure of the court to Gualior and Indore, and the number of dwellings has rapidly and materially diminished. The greater part of the houses are low; scarcely any exceed two stories in height. Nearly all are built of mud throughout, walls, roofs, and floors being of that material. A few of the superior houses have wooden fronts, which are elaborately carved, and the roofs are tiled. Some of the members of the Scindia family still reside at Oojein. [HINDUSTAN.]

**OOLITE**, the characteristic rock of one of the great systems of secondary strata. [GEOLOGY.] One of the purest examples of oolite is the fine yellow freestone of Ketton in Northamptonshire, which is wholly composed of round grains of concretionary structure, *adherent* by their contiguous surfaces, so as to form a stone easily wrought with the chisel, and of a durable quality. The Bath freestone is another example, where the grains (often hollow) are connected by interposed calcareous matter; the Portland stone resembles the former, but contains disseminated or aggregated siliceous matter; and not to extend the catalogue, much of the Lincolnshire freestone is oolite, of which the round grains are firmly compacted in a general basis of crystallized carbonate of lime. The resemblance of the grains to small ovals, or the roe of fishes, has given origin to the English term 'Oolite' (from the Greek *ὄον*, *ōon*, an egg), and the German 'Rogenstein,' or roestone.

Limestones possessing the oolitic character occur in different parts of the series of strata, but nowhere very abundantly except between the lias and the green-sands. Specimens may be found in the mountain-limestone at Clifton, Kirkby Lonsdale, &c., and in the magnesian limestone of Yorkshire and Derbyshire; and in this latter case the grains, large and distinct, show obviously the concentric lamination which belongs to certain oolites called 'pisolites,' and which may be detected in nearly all with the aid of the microscope.

**OOLITIC SYSTEM.** For the order of succession of the strata composing this great series of English strata see GEOLOGY. On the continent of Europe the corresponding strata receive, from their conspicuous development in the Jura Mountains, the titles of Jura Kalk and Calcaire Jurassique. [JURA.]

**OONALASHKA** is the most frequented of the Aleutian Islands, which stretch from the peninsula of Alaska, a part of the continent of North America, across the Pacific towards the peninsula of Kamchatka. It is situated in 54° N. lat. and 138° 20' W. long., and extends from north-east to south-west about fifty miles in length, but it varies greatly in width. Black masses of rocks rise perpendicularly out of the sea to a great elevation, and their summits are covered with eternal ice. The highest summit, called Makushkaia-sobka, is more than 7000 feet above the sea-level, and continues to smoke without interruption. There is also another active volcano. In 1795 a volcano rose out of the sea, about thirty miles west of the north-eastern point of Oonalashka. The rocks however are not composed of lava, nor has real lava been found, so far as the island has been yet examined. But there are several hot springs; and earthquakes are common. The rocks consist of granite and porphyry.

Oonalashka and the islands lying west of it are entirely destitute of trees. Willows occur in damp places, but they hardly rise above the luxuriant growth of grass and herbs. Even the lower hills only support alpine plants. The moisture of the atmosphere maintains a perpetual verdure on the steep mountain-summits up to the snow. The Russians have brought cattle to the island, and Lütke, in

1826, was able to get beef. Potatoes, turnips, and radishes are the only vegetables that thrive. No kind of grain succeeds. The lower shores of the islands are often lined with drift wood, which consists of pines, and several kinds of trees which grow in a much warmer climate, as the camphor-tree.

The inhabitants live chiefly by fishing. The surrounding sea abounds in cod, halibut, &c., and especially in seals. Whales are also numerous. Wild geese and ducks are very abundant in spring and autumn; they are salted and smoked for winter food. The eggs of the sea-fowl, which hatch in the neighbouring islets and rocks, are also collected. The inhabitants are Aleutians: their number is very small. The Russian American Company has an establishment at Illiuliuk, or Illoaloak, towards the north-eastern extremity of the island, which, in 1826, was inhabited by twelve Russian and twenty Aleutian families. The harbour, being surrounded by high mountains, is very safe, but it has the disadvantage of being difficult of access, owing to the entrance being narrow, tortuous, and there being no bottom at 100 fathoms. The climate of this place is rather wet than cold. There are almost continual fogs during the winter, and rain is abundant all the year round. The mean annual temperature is as high as 40°, which is one degree above that of Trondheim in Norway, and not quite two degrees less than that of Christiania.

(Sauer's *Account of a Geographical and Astronomical Expedition to the Northern Parts of Russia*; Langsdorf's *Voyages and Travels in various Parts of the World*; Kotzebue's *Voyage of Discovery into the South Sea and Behring's Strait*; Lütke's *Voyage autour du Monde*.)

**OORT, ADAM VAN**, son of Lambert Van Oort, was born at Antwerp in 1557. He derived his instruction from his father, and soon rose into esteem as a painter of history, and likewise as an able painter of landscapes. Van Oort's greatest honour however is, that he was the first instructor of Rubens, whose works have immortalised his master's name as well as his own.

Though in his best time his composition was agreeable and the drawing correct, he neglected the study of nature, and was entirely a mannerist. He seems not to have looked on painting as a fine art, but as a means of acquiring wealth. In his latter time his performances had little to recommend them except freedom of handling and good colouring. Yet, with all his defects, he was looked upon as a good painter; and Rubens used to say that if he had studied at Rome, he would have surpassed all his contemporaries. He died in 1641, aged 84.

**OPAL.** Of this mineral, which is essentially a hydrate of silica, there are mentioned by Mr. Brooke, in the 'Encyclopædia Metropolitana,' eleven varieties, and nearly as many are described by Phillips.

*Precious Opal, or Noble Opal.*—This mineral is white, bluish or yellowish white, and exhibits a beautiful variety or play of colours, as blue, green, yellow, and red, several of which appear together. Fracture conchoidal, with a vitreous or resinous lustre: it is easily broken, but scratches glass. Specific gravity 2.06 to 2.09. Infusible by the blowpipe, but becomes opaque and loses water. The most beautiful specimens occur in Hungary, but it has also been found in Saxony, South America, &c. Analysis of the Hungarian opal by Klaproth:—Silica, 90; Water, 10.

*Fire Opal.*—In this the internal reflection is bright red. It occurs with the precious opal in Hungary, and has also been found in Cornwall.

*Hydrophane.*—It is usually opaque, but is rendered transparent and exhibits the iridescent colours of the precious opal by immersion in water. According to Klaproth it contains a little alumina in addition to silica and water.

*Common Opal.*—This is of various shades of colour, as white, green, yellow, and red; but is entirely destitute of the play of colours exhibited by the noble opal. In other properties they greatly resemble each other. It is stated to contain a little oxide of iron mixed with the silica and water. It is found chiefly in Hungary and Saxony, but specimens have also been produced in Cornwall.

*Semi-Opal.*—This is more opaque than common opal, and is dull. It occurs either white, grey, yellow, brown, or green. It is found in the same places as the foregoing.

*Wood Opal,* so called from its showing the woody structure. It occurs of several tints of white, grey, brown, and black. It is generally harder than semi-opal, but does not materially differ from it in other properties. It occurs in Hungary and in Transylvania.

*Cacholong* is white opaque opal; harder than common opal; dull; brittle; fracture flat conchoidal. Specific gravity 2. Infusible before the blow-pipe. It is found on the banks of the river Cach in Bucharra, in loose masses. It occurs also in the Faroe Islands, Greenland, and Iceland.

*Opal Jasper. Ferruginous Opal.*—Opaque, or but feebly transparent on the edges. Colour generally deep shades of red, yellow, and grey. Fracture flat conchoidal. It appears to be a silicate of iron with water. Klaproth's analysis of a variety from Telkebanya gave—Silica, 43.5; Oxide of Iron, 47.0; Water, 7.5. It occurs in Hungary, Siberia, &c.

*Menilite.*—Occurs in irregular or reniform masses. Colour usually smoke-brown. Opaque, or slightly translucent. It occurs at Menil-montant, and St. Ouen near Paris, in beds of adhesive slate. According to Klaproth it consists of—Silica, 85.5; Alumina, 1; Water, inflammable matter, and traces of lime and iron, 11.

*Hyakite. Muller's Glass.*—Occurs in small globular and botryoidal forms. Lustre vitreous. Brittle, but scratches glass. Specific gravity about 2.4. Infusible by the blow-pipe. It occurs in amygdaloid, near Frankfort-on-the-Main, in Hungary, &c. According to Bucholz it consists of—Silica, with a trace of alumina, 92; Water, 6.3.

*Geyserite. Siliceous Sinter.*—This mineral is white, or yellowish or greyish white. It is brittle. Specific gravity about 1.807. Infusible *per se* by the blow-pipe. It is deposited by the hot springs of Iceland and elsewhere. According to Klaproth it consists of—Silica, 98; Alumina, 1.5; Iron, 5.

**OPERA** (Ital., *work*), a regular drama set to music, always accompanied by scenic representation, frequently by machinery, and sometimes by dancing. The true Opera, as found on all the Italian stages, whether in Italy or elsewhere, and as performed in the French language at the *Académie Royale*, admits no speaking; all is recitation or air, &c.; while what is called Opera in the national theatres of Germany and England, as well as the French *Opéra Comique*, is of a mixed kind—partly spoken, partly sung.

The constituents of an opera, says Rousseau, are, the Poem, the Music, and the Decorations. The poetry addresses itself to the mind, the music to the ear, the painting to the eye; and it is the duty of the three to unite their powers, in order to move and make an impression on the heart. Here, as in his well-known definition of music [Music, p. 19], Rousseau degrades the art which is the vital part of the opera, to a mere sensual enjoyment; but in the very next sentence he betrays that inconsistency which we have before had occasion to notice, by declaring that music is able to paint every picture and excite every passion; to give to poetry new force, to decorate it with new charms, and thus at once to exalt and triumph over it. If the opera music of Rousseau's time, most of which is now deservedly forgotten, could embellish, could add a single beauty to the poetry of Apostolo Zeno and of Metastasio, how much more must the feeble lyric drama of a later period be indebted to the exquisite melodies, the soul-stirring harmonies, of a Cimarosa and a Winter, of a Mozart and a Rossini! The fact is, that the poetry of an opera has long ceased to be considered otherwise than as a vehicle for music, and, but for the scenery and decorations, the saying of the Abbé Arnaud, that the Italian opera is a concert, of which the drama is the pretext, would be applicable to nine in ten of all productions of the kind that have appeared during the last seventy or eighty years.

Rousseau, Algarotti, Arteaga, and most writers on the Opera, refer to it as performed at the *Académie Royale*, and on the stages of Milan, Turin, Naples, &c., where the accessories—the scenery, machinery, and decorations—have always been splendid and appropriate, and not such as are so frequently witnessed at the two Italian theatres of London and Paris. Voltaire, in the following panegyrical lines, had in view the grand opera of the French capital, in which the ballet was, and still is, quite on an equal footing with the opera.

\* Il faut se rendre à ce palais magique,  
Où les beaux arts, la danse, la musique,  
L'art de tromper les yeux par les couleurs,  
L'art plus heureux de séduire les cœurs,  
De cent plaisirs font un plaisir unique.\*

And in all Opera-Houses, properly so called, beautiful scenery, and rich decorations of every kind, which will never cease to captivate, will always be required; though it is probable that the increasing taste for music in France and England will soon lead to its being considered of such paramount importance in those countries, that the Ballet will

lose much of its attraction, and by being reduced to a very subordinate and less costly condition, enable managers either to bestow more expense on the opera, in all its parts, or to diminish the prices of admission, now so exorbitantly high.

The moment that the Opera appeared out of its native country, and especially when it reached the British shores it was attacked by a host of critics and wits. Addison and Swift were among the first to level the shafts of ridicule at it, and were followed by Pope, Young, and many others. Addison lived to retract his opinion, for some of the absurdities which the opera in its infant state presented were soon corrected; though certainly enough remained, as must for ever remain, to sanction the objections of those who tried, or may still judge, the melo-drama by the cold stubborn laws of unpoetical probability. There were not wanting however defenders of this favourite child of the age and fashionable world, and foremost among them was the author of the verses above quoted, whose candid apology for the Opera—in the preface to his tragedy of *Oedipus*—shall here translate.

'The opera,' says M. Voltaire, 'is a representation as whimsical as it is magnificent; where the eyes and ears are more satisfied than the judgment; where a submission to music produces faults of the most ridiculous kind; where it is necessary to sing airs while destroying a city, and wander around a tomb; where are seen the palace of Pluto and that of the Sun, together with gods, demons, magicians, moorings, and temples erected and destroyed in the twinkling of an eye. We tolerate these extravagancies, we even admire them, because we imagine ourselves in fairy-land; and as we find splendid scenes, elegant dances, fine music, and some interesting scenes, we are content. It would be as absurd to require unity of time, place, and action in *Alcibiades* as to introduce dances and devils in *Cinna* or *Rodogune*. Nevertheless, though operas are released from such strictures, the best of the kind are those in which they are least frequently violated. . . . I reasonably require more perfection in a tragedy than in an opera, because in the former my attention is undivided—because in that my pleasure does not arise from a saraband or a pas de deux, for it is my mind alone that is to be gratified.'

Some of the absurdities of the opera are common to all dramatic representations, and those which are peculiar to it are now far less numerous than in 'the good old times.' This species of entertainment, though susceptible of much improvement, has not stood quite still while everything else, or nearly everything, has been advancing. That prominent feature however in the musical drama, which from the very first proved so obnoxious to ridicule, continues unaltered—the Recitative, which provoked the satire of our forefathers, and is yet rather tolerated than approved by the many—if a fault, is, we believe, a fault not imputable to the moderns, but to those whom it has hitherto been thought right to consider as the models of dramatic propriety and poetical taste. This leads to an inquiry concerning the origin of the melodrama—i.e. the musical drama, or opera.

That the opera, properly so called, whether Italian or French, is the offspring of the Greek drama—an opinion that for years past has been gaining ground—is supported by the most learned and able writers on the subject, and seems likely ere long to be universally adopted. The first that we have met with who has touched on this point is the philosopher of Malmsbury, Hobbes, who, in a letter to Sir William D'Avenant, says, 'There is, besides the grace of style, another cause why the ancient poets chose to write in measured language, which is this:—their poems were made at first with intention to have them sung, as well epic as dramatic (which custom hath long time been laid aside, but began to be revived in part of late years in Italy, and could not be made commensurable to the voice or instruments in prose—the ways and motions whereof are so certain and undistinguished (like the way and motion of a ship in the sea), as not only to discompose the best composer, but also to disappoint sometimes the most attentive reader, and put him to hunt counter for the sense. It was therefore necessary for poets in those times to compose in verse.' This letter is dated Paris, 1650; consequently written anterior to the establishment of the *Académie Royale*, or French opera.

Dryden, in the beginning of the preface to his *Albion and Albanus*, rather hastily calls the opera 'a modern invention, though built upon the foundation of the ethnic worship.'



and conjectures that it was borrowed from the Spanish drama; but in a postscript to the same, he corrects himself in the following rather awkwardly-expressed manner: 'Possibly the Italians went not so far as Spain for the invention of their operas: they might have it in their own country, and that by gathering up the shipwrecks of the Athenian and Roman theatres, which we know were adorned with dances, music, dances, and machines, especially the Greek.' The learned Jesuit, *Père Menestrier*, in his work, *Des Représentations en Musique*, maintains that the ancient tragedies were chanted. *Metastasio*, in his *Estratto della Poetica d'Aristotile*, expresses a most decided opinion that the Greek and Roman dramas, both tragedies and comedies, were sung, and cites in proof of this numerous classical authorities. *Pye*, in his *Commentary on the Poetic of Aristotle*, while disputing some of the inferences of *Metastasio*, is obliged, though unwillingly, to acknowledge that the opera 'most probably' is 'a lineal and legitimate offspring of the Greek tragedy,' and that the richness of the Roman theatre 'turned the necessary means of modulating the voice into a real musical accompaniment;' that is to say, the magnitude of the place rendered chanting or recitative unavoidable.

*Rousseau* is disposed to combat the opinion that the opera is a derivative of the ancient drama, but admits that the Greek tragedies were recited in a manner much resembling singing, that they were accompanied by instruments, and that choruses formed part of them. He afterwards says: 'that all Greek poetry was delivered in recitative, because, the language being melodious, it was sufficient to add thereto the cadence of the metre, and a sustained recitation, to render such recitation perfectly musical.' Granting the recitative and chorus, it seems to us that the lineal descent of the opera is proved. The reader will find other evidence on this subject in our article *Music*, pp. 24, 26, first columns.

But the resemblance of the opera, as it first appeared, to the ancient drama, will amount to little less than identity, if the statement and reasoning of the erudite author of *A Dissertation on the Rise, &c. of Poetry and Music* are admitted. *Dr. Brown* (more known by his *Estimate of the Manners and Principles of the Times*), after showing, to us in a very satisfactory manner, that the Greek drama was musical, proceeds to state, that 'the same union was borrowed and maintained through the several periods of the Roman empire. If therefore we suppose, what is altogether probable, that the form of the ancient tragedy had been kept up in some retired part of Italy which the barbarians never conquered, we then obtain a fair account of the rise of the modern Opera, which hath so much confounded all inquiry.'

'As Venice,' the writer continues, 'was the place where the opera first appeared in splendour, so it is highly probable that there the ancient tragedy had slept in obscurity during the darkness of the barbarous ages. For while the rest of Italy was overrun by the nations from the north, the seas and morasses of Venice preserved her alone from their incursions. Hence, history tells us, the people flocked to Venice from every part of Italy; hence the very form of the republic hath been maintained for thirteen hundred years; and from these views of security, it was natural for the helpless arts to seek an asylum within her canals from the fury and ignorance of a barbarous conqueror. Other circumstances concur to strengthen this opinion. The Carnival first appeared in splendour at Venice, beyond every other part of Italy. Now the Carnival is, in many circumstances, almost a transcript of the ancient *Saturnalia* of Rome.'

'That the modern Opera,' *Dr. Brown* proceeds, 'is no more than a revival of the old Roman tragedy, and not a new invented species, will appear still more evident, if we consider that it is an exhibition repugnant to the universal genius of modern customs and manners. We have seen the natural union of poetry and music as they rise in the savage state, and how this union forms the tragic species in the natural progression of things. Hence we have deduced the musical tragedies of ancient Greece. But in ancient Rome, it appears, they arose merely from imitation and adoption. Nor could it be otherwise, because the Romans wanted the first seeds or principles whence the musical tragedies of the Greeks arose. The same reasoning takes place with respect to the modern opera: it emerged in that very city where, most probably, it must have lain hid; in a city whose other entertainments are evidently borrowed

from those of ancient Rome. And if to these arguments we add, that the subjects of the very first Operas were drawn from the fables of ancient Greece and Rome, and not from the events or achievements of the times; and further, that in their form they were exact copies of the ancient drama; such accumulated proofs amount to nearly a demonstration that the Italian Opera is but a revival of the old Roman tragedy.' (pp. 201-203.)

Some writers imagine that the modern musical drama originated in Italy, towards the latter part of the fifteenth century. *Menestrier* believed, on the authority of *Sulpitius*, that the first opera was performed at Rome about the year 1480, and that a few years after, a gentleman of Lombardy, named *Botta*, entertained a duke of Milan with a sumptuous supper, accompanying each course with a kind of opera (*une espèce d'opera*). Performances of the latter kind certainly could not have exceeded a single scene. But after collating what has been stated by various authors, we are persuaded that no regular opera was produced and publicly performed till *Ottavio Rinuccini* wrote and *Jacopo Peri* composed the drama of *Euridice* for the nuptials of *Henri IV.* of France and *Mary of Medicis*. This was represented in a very splendid manner at Florence, in 1600, and there published in the same year. *Dr. Burney* tells us (*Hist.*, iv. 25) that he was never able to find more than one copy of *Peri's Euridice*, which was in the library of the *Marchese Rinuccini*, a descendant of the poet. Having the good fortune to possess this very rare work, which is now before us, we can corroborate what the musical historian has said of it, that it is printed in score and barred, two very uncommon circumstances at the time of its publication; that the recitative seems to have been not only the model of subsequent composers of early Italian operas, but of the French operas of *Lulli*; that figures are often placed over the base to indicate the harmony; that the time changes as frequently as in the old French serious operas; and though the word *aria* occurs, it is difficult to distinguish air from recitative by any superiority of melody, except in the choruses. There is no overture to this, but a musical prologue of seven stanzas instead, sung in the character of Tragedy. *Peri*, in an address to his readers (*ai lettori*), gives an account of his orchestra, which was placed behind the scenes, and consisted of a harpsichord, a large guitar, a *lira grande* (i.e. a viol da Gamba, according to *Burney*), and an arch-lute.

The Bolognese dispute with the Florentines the honour of having first produced a musical drama, but it appears that the *Euridice* was performed in their city the year after it had been produced at Florence. The opera was introduced at Venice in 1637, at Naples in 1646, and at Rome in 1671.

The Italian Opera made its way to London by slow and cautious steps. The sudden introduction on the public stage of a foreign language, and that language delivered in recitative, would have put the tolerating spirit of our countrymen to a trial far too severe to be prudent; the event therefore, which was anxiously wished for by the higher orders, to whom novelty is everything, and by those who had acquired a new taste in their travels, was gradually brought about. In July, 1703, Italian *intermezzi*, or 'interludes and musical entertainments of singing and dancing,' were performed at York Buildings. Two years after, *Arsinoë*, translated from the Italian, the dialogue and narrative parts in recitative, and the singers all English, was produced at Drury Lane; the pit and boxes were allotted to subscribers. 'Before and after the opera, dances and singing, by Signora Margarita de l'Epine.' In 1706 *Camilla*, also a translation, was performed by the same persons in a similar manner. The next year witnessed a further and still bolder advance towards the final introduction of the exotic melo-drama; *Thomyris, Queen of Scythia*, was brought out at the same theatre, in which *Urbani*, a castrato, and two foreign women sang their parts in Italian, the other performers singing theirs in English! At length, in 1710, *Almahide*, written wholly in Italian, and performed exclusively by foreign singers, was presented to the public at the Queen's theatre in the Haymarket. Thus the Italian Opera gained a settlement in this country; and in spite of some opposition and much ridicule by which it was at first attacked, soon became firmly fixed, and at length seems to be as necessary, as a source of amusement to the metropolis of this kingdom, as any other favourite and long-established entertainment.

The Italian Opera was brought into France in 1646, by  
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the Cardinal Mazarin, and continued for some years to be performed at the Louvre; but the establishment of the *Académie Royale de Musique*, in 1670, superseded it, and except in 1772, when a troop of Italians represented Pergolesi's *Serva Padrona* as an *intermezzo*, between the acts of Lulli's *Acis et Galatée*, it never again was heard in Paris till introduced there early in the present century.

The grand French Opera is the legitimate melodrama, being wholly musical, and was founded by Louis XIV. In 1669 that monarch granted letters-patent to the Sieur Perrin for the establishment of an '*Académie des Opera en Langue Française*,' who taking as his partner the Sieur Cambert as composer, commenced his undertaking at the *Théâtre de l'hôtel de Guénégaud*, in 1671, where he produced *Pomone*, the poetry by himself, and set to music by his colleague. This is a pastoral drama, opening with a musical prologue of about thirty lines, in which the author has contrived to stuff a greater quantity of nauseous flattery of the *Grand Monarque* than perhaps was ever compressed into so small a compass. In 1672 the privilege was transferred to Lulli, who, with the assistance of Quinault, a lyric poet of very superior genius, conducted the *Académie* in a most able and successful manner till his death. [LULLI.] The *Opéra Comique* had its birth in France in 1730, in imitation of the Italian *Opera buffa*. This however is of the mixed kind, the dialogue being spoken.

The genuine Italian Opera has long flourished in Germany. 'The emperors,' says Burney, 'from the time of Ferdinand II. to Charles VI., seem to have had an invariable partiality for the Italian language and music. On the birth of an archduchess in 1724, an opera was exhibited at Vienna with uncommon magnificence. The performers were all persons of high rank, and his imperial majesty himself accompanied the voices on the harpsichord, as principal director.' The opera, entitled *Eurystheus*, was written by Apostolo Zeno, and composed by Caldara. That imperial poet-laureate was succeeded in office by Metastasio, who wrote many of his admirable lyric dramas for the Italian theatre at Vienna, which were set by the great masters of the day. His *Clemenza di Tito*, as composed by Mozart, will for ever be considered, by all true judges of dramatic poetry and music, as the most beautiful and finished example of the melodrama that human genius ever produced. For the different German courts some of the finest operas have been composed, but we can here only refer to the names of their authors, HANDEL, GRAUN, HASSE, GLUCK, WINTER. MOZART, &c.

What is called English Opera is, with two or three exceptions, of the mixed kind. The first that we have any account of that can be relied on is Shadwell's *Psyche*, composed by Matthew Lock, and brought out in 1673. Two years after, Dryden wrote his *Albion and Albanus*, an opera, set by a Frenchman, Louis Grabu, whom, to please the antinational king, Charles II., Dryden, in a preface to the work, praises in high though most undeserved terms, at the expense of his countrymen. But when that great poet wrote his *King Arthur*, he was fain to apply to Purcell for assistance, whose music has saved it from the oblivion to which it would otherwise be condemned. The poet, in an epistle-dedicatory to this, takes an opportunity of retracting his opinion of English composers. He says that music had then 'arrived to a greater perfection in England than ever formerly; especially passing through the artful hands of Mr. Purcell, who has composed it with so great a genius, that he has nothing to fear but an ignorant ill-judging audience.' Addison's *Rosamond* was, it is to be supposed, a real opera, the dialogue in recitative. This was represented in 1707, but failed, as Hawkins tells us, owing to the poverty of the music by one Clayton. *The Beggar's Opera* is so well known that it need only be named. The music is a good selection of the airs most popular at the time, arranged by the celebrated Dr. Pepusch. *Artaxerxes*, by Dr. Arne, is the only opera, strictly so called, that keeps its place on the stage. This is nearly a translation of Metastasio's *Artaserse*, by the composer himself, and though at the time severely criticised, is far superior to most of the musical dramas that have since been written. The music is rich in beautiful melody, and if other attempts at an English recitative opera had proved equal to this, the melodrama might now have been firmly rooted in British ground. Arne composed many other charming musical pieces; his *Love in a Village* will never be superannuated; and in truth, if the dramatic music of some of our countrymen who charmed

the public ear during the latter half of the last century could be heard without prejudice, and without that yearning after what is foreign and new which characterises 'the fashionable world,' and others who yield to its influence, it would be admitted that in original expressive melody we are inferior to no nation in Europe, startling as the proposition may be to those who have not impartially and duly considered the subject. [ARNE; JACKSON; LINLEY; DIBDIN; SHIELD; ARNOLD; STORACE.]

OPERA. [ENGLISH DRAMA, vol. ix., p. 409.]

OPERATION. This article is to be considered as a continuation of NEGATIVE AND IMPOSSIBLE QUANTITIES and as a development of the views of the nature of algebra there laid down. It cannot be read entire, except by students who have some acquaintance with the Differential Calculus, &c.

The great considerations on which the mathematics are founded have always, until lately, been stated as those of number and space; so that arithmetic and geometry have been called the wings of the exact sciences. This similitude, suggested by the twofold character of its objects of comparison, may be carried a step further; for as wings will not enable a bird to fly without nerves and sinews, so the mere consideration of space and number will never make a mathematician, without an organised method of using the ideas of both. We have already [MATHEMATICS] suggested that the science of operation must be a constituent part of mathematics; but it has always been so mixed up with the sciences bearing names derived from number and measure that until lately it has had neither separate name nor existence: and even now, what has been done in it is only the mere beginning of a system.

The use of symbols of operation not standing for magnitude but for directions how to proceed with magnitudes, began with Leibnitz and Newton, before whose time all algebraical characters denoted simple numbers. The progress of the Differential Calculus forced the attention of mathematicians upon modes of denoting, not results of processes, but ways of proceeding. The generalizations arising out of the organization which notation gave to processes led to the use of indefinite and arbitrary symbols of operation. [FUNCTION.] Finally, it was observed that the symbols of operation employed in many general theorems would give simple and well-known relations if their meaning as symbols of operation were forgotten, and they were considered as symbols of quantity. For example, if  $\Delta \phi(x)$  denote  $\phi(x+1) - \phi x$ ,  $\Delta$  being a symbol, not of a quantity multiplying  $\phi x$ , but of an operation to be performed upon  $\phi x$ ; and if  $D\phi x$ ,  $D^2\phi x$ , &c. denote the successive differential coefficients of  $\phi x$ , Taylor's theorem gives

$$\Delta \phi x = D \phi x + \frac{1}{2} D^2 \phi x + \frac{1}{2.3} D^3 \phi x + \dots$$

If  $\Delta$  and  $D$  had stood for quantities (which they do not), the preceding equation might have been divided by  $\phi x$ , and the result would have been

$$\Delta = D + \frac{1}{2} D^2 + \frac{1}{2.3} D^3 + \dots = e^D - 1 \dots (A)$$

If such a result had been obtained by those mathematicians who first ventured on the use of a negative quantity, they would doubtless have given to operations a sort of existence as quantities, and would have felt no repugnance to say that the direction to change  $\phi x$  into  $\phi(x+1) - \phi x$  was equal to  $e$  raised to the power of a direction to differentiate  $\phi x$  diminished by a unit. This might have beat their negative quantity (or arithmetical quantity less than nothing) in the complication of its absurdities, but not in absolute impossibility. Let two persons be required, the one to take four pebbles out of three, and the other to subtract a unit from (not the differential coefficient of  $\phi x$ , but) the direction to take the differential coefficient of  $\phi x$ , and it could hardly be said that the first had a more hopeless task than the second.

The modern mathematicians, with Lagrange at their head, had had too much experience of the nature of extensions to hazard any assumption upon the properties of symbols of operation, when separated from the quantity to be operated upon. The first step made was the observation that certain theorems involving symbols of operation might be easily remembered by the resemblance of the formulae to well-known expressions, in fact, by the coincidence of those formulae with the expressions, on the supposition that

the symbols of operation are changed in meaning, and become symbols of quantity. And if it be said that these mathematicians were saved from introducing a difficulty analogous to that of negative quantities by the want of resemblances to the course they might have adopted already existing in common modes of speaking and common views of arithmetic, it may be answered that such was not the case, but that it would have been easy, and was not without precedent, to consider arithmetic itself as a science of operations upon one single magnitude, the unit. If we always express the unit by  $I$ , we may, if we please, consider 2 not as  $I+I$ , but as the direction to perform upon  $I$  the operation  $I+I$ ; so that 2 being merely a direction what to do,  $2I$  may represent the result of so doing: similarly 3 may be the direction to proceed as in  $I+I+I$ , and  $3I$  its result. And  $3 \times 2$  would be a direction to perform 3 upon the result of 2, or to take  $2I+2I+2I$ , or  $(I+I)+(I+I)+(I+I)$ , or  $6I$ . If then we say  $3 \times (2I) = 6I$ , we have an equation between magnitudes; but if we throw away  $I$ , as we just now did  $\phi x$ , we have  $3 \times 2 = 6$ , an expression of equivalence of operations. Now it might very reasonably have been asked whether these operations must be the only ones which will admit of being treated by themselves and viewed independently of the subjects of operation; and a direct assumption of such modes of notation as that marked (A), even when  $\Delta$  and  $D$  were considered independently, though it might not have been fully explicable, would have appeared to be nothing but a natural extension of views which had already been taken to a limited extent.

The process however which was actually followed was this: forms similar to (A) having been observed, in which, whatever might be thought of them as they stood, were found ready means of returning to well-known truths, it was natural to ask whether an application of algebra to the form (A), producing of course a transformation of both sides, would lead to a result from which, by the same method of returning, another known truth might be produced. For example, assume that  $D$  and  $\Delta$  are to be treated as quantities, and  $\Delta = \epsilon^D - 1$  gives  $1 + \Delta = \epsilon^D$ ,  $\log.(1 + \Delta) = D$ , or

$$D = \Delta - \frac{1}{2} \Delta^2 + \frac{1}{3} \Delta^3 - \dots$$

Now restore  $\phi x$  to every term, and let  $D$  and  $\Delta$  reassume their operative meanings, so that  $D\phi x$  is the differential coefficient, and  $\Delta\phi x$ ,  $\Delta^2\phi x$ , &c. are the successive DIFFERENCES of  $\phi x$ ,  $x$  being changed into  $x+1$  at each step. We have then

$$D\phi x = \Delta\phi x - \frac{1}{2} \Delta^2\phi x + \frac{1}{3} \Delta^3\phi x - \dots$$

a theorem which must be true if the preceding method be legitimate. This theorem is found to be true by other and certain modes of demonstration: consequently the legitimacy of the preceding method has some presumption in its favour, arising from its leading to an otherwise known truth.

In this way many theorems were investigated, upon the following plan of proceeding:—1. Throw away symbols of quantity from a known theorem, and proceed in any manner which may appear eligible with the symbols of operation, treating them as if they were quantities. 2. When a result has been obtained, restore the symbols of quantity to their old places, and those of operation to their old meanings. 3. The result as thus viewed has all the presumption in its favour which arises from its being the legitimate consequence of a method which, whether accurate or not, has never been found to lead to anything but what could otherwise be satisfactorily shown to be true. And though Lagrange himself, Arbogast, the English translators of Lacroix, Brinkley, &c. may have used language in reference to this method which would seem to imply that they considered it as one of demonstration, yet it is obvious, from the care taken by them to have abundant external verification in every case, that their results were considered by themselves as resting on such a presumption as that above noted; though it is also evident that they considered the presumption as amounting to moral certainty, which indeed they were justified in doing.

A student who reads on this subject for the first time, will be apt to let his ideas run farther than they should, and to imagine that this treatment of operations may be made universal. For instance, if  $\phi x = x^2$  and  $\psi x = x^3$ , and if

$\phi + \psi$  be taken as representing  $x^2 + x^3$ , he might suppose that  $\phi + \psi$  performed twice, or

$$(x^2 + x^3)^2 + (x^2 + x^3)^2$$

represented by  $(\phi + \psi)^2$ , should be the same thing as

$$\phi^2 + 2\phi\psi + \psi^2, \text{ or } (x^2)^2 + 2(x^2)(x^3) + (x^3)^2.$$

This however will be found not to be the case, and thus it appears that a line is to be drawn, distinguishing operations which may be used independently of quantities from those which may not. Until this line can be properly drawn, nothing like demonstration of the method, when true, can be given; or rather perhaps the converse, that is to say, a method of demonstration of such cases as give truths will draw the line which separates these from the rest. We proceed to give some account of this method of demonstration.

We do not know how far those who used the *separation of the symbols of operation and quantity* (as it was called) had before their minds those views which would have made their method intelligible in a rational point of view, which was all it wanted of mathematical exactness. But, looking only at their modes of expression, we cannot find anything of the kind. Lagrange (*Mém. Acad. Berlin*, 1772) gave only theorems without any mode of deducing them. Arbogast assumes the 'séparation des échelles' without remark. Laplace, by the aid of his theory of generating functions, must be held to have strictly demonstrated some isolated classes of the theorems which this method gives. But nothing like a general account of the reason why this separation of the symbols of operation and quantity leads to truth in certain cases and not in others, ever appeared, to our knowledge, before the publication of a memoir by M. Servois in the 5th volume of the 'Annales de Mathématiques,' (Lacroix, vol. iii., p. 726). The author exhibits those properties of the separable operations on which the legitimacy of the separation depends; and making a separate species of calculus of functions out of those properties, fully succeeds in demonstrating that differences, differentiations, and multiplications by any factors which are independent of the variables, may be used as if their symbols of operation were common algebraical quantities.

The last step was virtually made by Dr. Peacock, in his *Algebra* (1830); for though this work does not mention the subject, yet it is the first which lays down the principles on which the theory of separation is neither a resemblance of algebra, nor a calculus of functions founded on algebra, but *an algebra*, or if the reader pleases, algebra itself; so that its conclusions rest upon the same foundation as those of ordinary algebra.

We have [NEGATIVE AND IMPOSSIBLE QUANTITIES, p. 132, 133] pointed out what is meant by symbolical algebra, as distinguished from explained or interpreted algebra. Granting a certain number of fundamental relations, which are to be true, the logical consequences of combining those relations must be true also: thus, if it be universally true that  $a+b=b+a$ , and that  $xy=yx$ , it follows, even before  $a, b, +, x, xy$ , &c. have any meaning assigned, that  $(a+b)x = x(a+b) = x(b+a)$ . If, as in the article cited, we select all the primary relations on which algebraical transformations depend, and then bear in mind that the truth of all their consequences depends on the truth of those relations only, not on the relations being true for one meaning or another meaning of the symbols, but on the truth only of the relations, come how it may—we shall then see that all formulæ of algebra may be used as expressions of truths, whatever may be the meaning of the symbols employed, provided only that, such meanings being given, the fundamental relations are true. We have already seen that this may be carried the length of extending the meanings of all the symbols of algebra, in such manner that a science is created with definitions wide enough to include among its rational objects not only the negative quantity, but also its square root. This was *extension* only (p. 134); we shall now show a process which, though it is still extension, is of another character. It is remarkable that all the additions which have been made to the interpretations of algebra by modern writers have been pure extensions; that is to say, in no one instance has a new interpretation been given to a symbol of which the preceding ones were not particular cases. It yet remains to see whether a real alteration of interpretations is possible.

In our present inquiry, we need not trouble ourselves to make any particular consideration of the signs  $+$  and  $-$ ,



They retain their algebraical meaning, so that whatever A and B may stand for,  $+(+A) = +A$ ,  $- (+A) = -A$ , &c.

If we now ask, what are the fundamental symbolical relations of algebra which remain, after those which depend on  $+$  and  $-$  are taken away, we shall find them to be as follows:—1. The *distributive* character, as it is called, of the operation  $ab$ , with respect to  $+$  and  $-$ , as shown in  $a(b+c-e) = ab+ac-ae$ . 2. The *commutative* or *convertible* character of the same operation with respect to others of the same kind and itself, as shown in  $abc = acb = bca$ , &c., and  $ab = ba$ . 3. The *depressible* character of operations of the species  $a^m$ , when performed upon other operations of the same kind, as shown in  $a^m a^n = a^{m+n}$ ,  $(a^m)^n = a^{mn}$ . These laws of operation being granted, no matter what the nature of the interpretation under which it is found possible to grant them, all that is necessary to the mechanism of algebra will be found to have been granted. It will be remembered that we speak of  $1 \div a$  under the symbol  $a^{-1}$ .

In arithmetic, as already seen, we may, if we please, consider the symbols 2, 3, &c., as indicative of operations performed upon the unit. Let us extend this notion, and, instead of the unit, make  $\phi x$ , any function of a variable  $x$ , the subject of operation; this function being always understood, if not expressed. Thus any symbol E has an operative meaning in itself, but when written in an equation stands for the result obtained by performing that operation upon  $\phi x$ , which may also be signified by  $E(\phi x)$ . Also let  $E+F$  and  $E-F$  stand for the algebraical sum and difference of the results of the operations E and F performed upon  $\phi x$ . Let us now appropriate E to stand for the simple operation of changing  $x$  into  $x+h$ , or  $x$  + any quantity independent of  $x$  in value: and to distinguish the different increments, let  $E_h$ ,  $E_k$ , &c.

denote the operations of changing  $x$  into  $x+h$ ,  $x+k$ , &c. It is then very easily shown that E possesses the distributive, convertible, and depressible characters essential to its being logically the object of algebraical transformation. Take two functions,  $\phi x$  and  $\psi x$ , either assumed independently or resulting from preceding operations: it follows then that  $E_h(\phi x \pm \psi x)$  is  $\phi(x+h) \pm \psi(x+h)$ , which is  $E_h \phi x \pm E_h \psi x$ : or the distributive character is established. Again, consider  $E_h(E_k \phi x)$  and  $E_k(E_h \phi x)$ : first,  $E_h \phi x$  means  $\phi(x+h)$ , on which perform  $E_k$ , or change  $x$  into  $x+h$ , giving  $\phi(x+h+k)$ ; next,  $E_k \phi x$  is  $\phi(x+k)$ , on which  $E_h$  being performed, gives  $\phi(x+k+h)$ , the same as  $\phi(x+h+k)$ . Consequently  $E_h E_k \phi x = E_k E_h \phi x$ , or the convertible character of E is established. Thirdly, consider  $E_h^3 E_h^2$ , meaning that the operation  $E_h$  having been twice performed,  $E_h$  is to be three times performed upon the result: we have evidently  $\phi(x+5h)$ , or  $E_h^5 \phi x$ ; and if  $E_h^2$  were to be performed four times running, we should have  $E_h^{12}$ . Hence the depressible character of the successive operations is established: and, though it is a wide step for the beginner to make, the applicability of all the formulæ of algebra is now proved, subject, as in common algebra, to difficulties of interpretation occurring in results.

A simplification of the preceding notation may be made as follows: if E or  $E^1$  be simply a direction to increase  $x$  by unity, and  $E^0$  a direction to let it remain unaltered, it is clear that  $EE \phi x$  must mean  $\phi(x+1+1)$ , or  $E^2 \phi x$ ; so that  $E^2 \phi x$  and  $E \phi x$  are the same. Similar reasoning applies to  $E_h$  whenever  $h$  is a whole number; and shows

that it is  $E^h$  and nothing else. Similar reasoning also applies to  $E^{-h}$  where  $h$  is a whole number: for  $E^{-h}$  must be so interpreted that  $E^h$  performed upon it may give  $E^{-h-h}$  or  $E^0$ ; that is  $E^{-h} \phi x$  with  $x$  changed  $h$  times into  $x+1$  must be  $E^0 \phi x$ , or  $\phi x$ ; or  $E^{-h} \phi x$  must be  $\phi(x-h)$ . In like manner it may easily be shown that one of the meanings of  $E^h \phi x$ , where  $h$  is fractional, is  $\phi(x+h)$ : but, as in common algebra, of which all the conclusions, as shown, here apply, when  $h$  is a fraction,  $E^h$  may be any one out of operations as many in number as there are units in the deno-

minator of  $h$ . To take a very simple case, required  $E^{\frac{1}{2}} \phi(x)$ , meaning an operation which, twice repeated, gives  $E \phi x$ , or  $\phi(x+h)$ . This condition is evidently satisfied by  $\phi(x+\frac{1}{2}h)$ , but it is also satisfied by  $-\phi(x+\frac{1}{2}h)$  for if part of the operation consist in change of sign, two repetitions of the operation reproduce the original sign.

It must not be forgotten that, in finding new objects of algebraical reasoning, we have not lost our rights over the old ones; thus any letter may stand for a multiplier or divisor of the universal subject of calculation,  $\phi x$ . But these independent multipliers must not contain  $x$ : for if they did contain  $x$ , the convertibility of the multipliers with E would not any longer be practicable. If, for instance, we consider  $a E \phi x$ , which is  $a \phi(x+h)$ , we find it to be the same as  $E(a \phi x)$ , for  $a$ , being independent of  $x$ , is not affected by E. But if we consider  $x E \phi x$ , and  $E(x \phi x)$ , we find the first to be  $x \phi(x+h)$ , and the second to be  $(x+h) \phi(x+h)$ .

To generalise the preceding, we may suppose  $E^a \phi x$  to mean  $\phi x$  as before, and  $E \phi x$  to stand for  $\phi(x+a)$ , where  $a$  may have any value we please independent of  $x$ . And it is in our power to abbreviate any collection of operations by using a single symbol to stand for it. Thus Laplace uses  $\nabla \phi x$  to stand for such a set of operations as

$$A_0 \phi(x) + A_1 \phi(x+a) + A_2 \phi(x+2a) + \dots$$

which we should denote by

$$\nabla = A_0 + A_1 E + A_2 E^2 + \dots$$

Again, if in common algebra  $f y$  were  $A_0 + A_1 y + \dots$  we might abbreviate the preceding into  $f E$  instead of  $\nabla$ .

But it may be said that this, though intelligible as to simple operation E, its repetitions  $E^2$ ,  $E^3$ , &c., its inverse and repetitions of it  $E^{-1}$ ,  $E^{-2}$ , &c., ceases to have meaning when we come to apply it to other functions of algebra. What, for instance, is  $\log(1+E)$ ? How can the direction to add  $\phi(x+a)$  to  $\phi x$  have a logarithm? This question arises from the student having carried with him into purely symbolical algebra (in which it is the first requisite to drop all meanings) significations of symbols derived from ordinary arithmetical algebra. Now it is to be remembered that as far as we have yet gone, all the transcendental symbols of algebra,  $a^E$ ,  $\log E$ ,  $\sin E$ ,  $\cos E$ , &c. have not been mentioned, far less defined; they are not therefore absurd, but only, for the present, unmeaning. The question is, how are we to give them meaning; at our pleasure, or by deduction? Evidently the latter, for we are bound to retain the power of using algebraical transformations as they now exist. Since then  $a^E$  in common algebra is equivalent to  $1 + \log a \cdot x + \frac{1}{2}(\log a)^2 x^2 + \dots$  we must lay it down that  $a^E = 1 + \log a \cdot E + \dots$ , or that  $a^E$  must be viewed, when it means an operation to be performed upon  $\phi x$ , as an abridgement of

$$\phi x + \log a \cdot E \phi x + \frac{1}{2}(\log a)^2 E^2 \phi x + \dots$$

This is unquestionably the most difficult step of the whole. We shall have occasion further to consider it in the article RELATION, but for the present the following may be sufficient. Since the total operation  $A_0 + A_1 E + A_2 E^2 + \dots$  can be easily understood, consisting merely of the successive performance of the operation E, the multiplication of the results by given quantities of common algebra, and the addition of the products; and since all the transcendentals of common algebra can be expanded in series of the above form, in such manner that the series have all the algebraical properties of the transcendentals they stand for: let us consider the transcendental symbols of operation as abbreviations of the series, supposed to stand for series of operations.

We shall now proceed to some examples. First, let it be required to transform the series  $A_0 \phi x + A_1 \phi(x+a) + A_2 \phi(x+2a) + \dots$ . This may be represented by  $A_0 + A_1 E + A_2 E^2 + \dots$  performed upon  $\phi x$ . Let the latter series in common algebra be  $f E$ , then  $f E$ , considered as a symbol of operation, stands for the preceding complex operation. Let the transformation be required to be made into a series of terms containing  $\phi x$  and its differences: let  $\phi(x+a) - \phi x = \Delta \phi x$ , then  $E - 1$  is  $\Delta$ , or  $E = 1 + \Delta$ . But  $f E$  or  $f(1+\Delta)$  is  $B_0 + B_1 \Delta + B_2 \Delta^2 + \dots$  where  $B_0$ ,  $B_1$ , &c. are the values of  $f y$  and its successive differential coefficients when  $y = 0$ , divided by 1, 1, 1.2, 1.2.3, &c. Consequently the preceding series is the same as

$B_0 \phi x + B_1 \Delta \phi x + B_2 \Delta^2 \phi x + \dots$ . For instance, let the series be  $\phi x - \phi(x+a) + \phi(x+2a) \dots$  or  $(1-E+E^2-\dots)\phi x$  or  $(1+E)^{-1}\phi x$ . Write  $1+\Delta$  for  $E$ , and we have  $(2+\Delta)^{-1}\phi x$  or

$$\left(\frac{1}{2} - \frac{1}{4}\Delta + \frac{1}{8}\Delta^2 - \dots\right)\phi x, \text{ or}$$

$$\frac{1}{2}\phi x - \frac{1}{4}\Delta\phi x + \frac{1}{8}\Delta^2\phi x - \dots$$

We have chosen this result as one which is very easy to verify. Let  $\phi x, \phi(x+a), \&c.$ , be denoted by  $X_0, X_1, \&c.$ , then [DIFFERENCES] we have

$$\phi x = X_0, \Delta\phi x = X_1 - X_0, \Delta^2\phi x = X_2 - 2X_1 + X_0, \\ \Delta^3\phi x = X_3 - 3X_2 + 3X_1 - X_0, \&c.$$

Substitute these in  $\frac{1}{2}\phi x - \frac{1}{4}\Delta\phi x + \dots$ , and we have

$\frac{1}{2}X_0 - \frac{1}{4}(X_1 - X_0) + \dots$ : take a few terms, developing the fractional multiplication, and we shall find the preceding to be identical with

$$\left(\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots\right)X_0 - \left(\frac{1}{4} + \frac{2}{8} + \frac{3}{16} + \dots\right)X_1 + \\ \left(\frac{1}{8} + \frac{3}{16} + \frac{6}{32} + \dots\right)X_2 - \dots \text{ or}$$

$$\frac{1}{2}\left(1 - \frac{1}{2}\right)^{-1}X_0 - \frac{1}{4}\left(1 - \frac{1}{2}\right)^{-2}X_1 + \frac{1}{8}\left(1 - \frac{1}{2}\right)^{-3}X_2 - \\ \text{or } X_0 - X_1 + X_2 - \dots \text{ or } \phi x - \phi(x+a) + \phi(x+2a) - \dots$$

We shall now take an example of interpretation. Required the meaning of  $\Delta^{-1}$  by means of  $E$ ? Since  $\Delta = E - 1$ , we have  $\Delta^{-1} = (E - 1)^{-1} = E^{-1} + E^{-2} + E^{-3} + \dots$  or

$\Delta^{-1}\phi x$  means  $\phi(x-a) + \phi(x-2a) + \dots$  *ad infinitum*.

This is easily shown to be consistent with the relation  $\Delta\Delta^{-1} = 1$  or  $\Delta\Delta^{-1}\phi x = \phi x$ , for if the preceding series be called  $\psi x$ , we have  $\Delta\Delta^{-1}\phi x = \Delta\psi x = \psi(x+a) - \psi x = (\phi x + \phi(x-a) + \dots) - (\phi(x-a) + \phi(x-2a) + \dots) = \phi x$ .

As yet we have nothing which might not have been done with tolerable ease by common methods, nor shall we have done more in proving Taylor's Theorem, but the step which we shall make to follow that proof will be an instance of the deduction of a theorem which is of a more difficult character.

Let  $(\phi(x+\theta) - \phi x) : \theta$  be called  $D_\theta$ : then the smaller  $\theta$  becomes, the more nearly is  $D_\theta\phi x$  the differential coefficient of  $\phi x$ , or  $\phi'x$ . Let  $\theta$  be the  $n$ th part of the given quantity  $a$ : then the smaller  $\theta$  is, the greater must  $n$  be. We have then

$$\phi(x+\theta) = (1 + \theta D_\theta)\phi x,$$

$$\phi(x+2\theta) = (1 + \theta D_\theta)^2\phi x, \text{ since}$$

$$\phi(x+2\theta) - \phi(x+\theta) = \theta D_\theta\phi(x+\theta) \text{ or}$$

$$\phi(x+2\theta) = (1 + \theta D_\theta)\phi(x+\theta) = (1 + \theta D_\theta)^2\phi x.$$

Proceeding in this way we obtain  $\phi(x+n\theta)$  or  $\phi(x+a)$   
 $= (1 + \theta D_\theta)^n\phi x = \phi x + n\theta D_\theta\phi x + n\frac{n-1}{2}\theta^2 D_\theta^2\phi x + \dots$

For  $n\theta$  write  $a$ , and the preceding becomes

$$\phi(x+a) = \phi x + a\frac{a-\theta}{2}D_\theta^2\phi x + \dots$$

which being always  $= \phi(x+a)$ , has a limit also  $= \phi(x+a)$ . Take that limit by diminishing  $\theta$  without limit, and we see that  $D_\theta\phi x, D_\theta^2\phi x, \&c.$ , become  $\phi'x, \phi''x, \&c.$ , or

$$\phi(x+a) = \phi x + \phi'x \cdot a + \phi''x \frac{a^2}{2} + \dots$$

which is Taylor's Theorem. Suppose we denote the operation of differentiation by  $D$ , and  $\phi(x+a) - \phi x$  by  $\Delta\phi x$ , we have then

$$1 + \Delta = 1 + aD + \frac{a^2}{2}D^2 + \dots = e^{aD};$$

a particular case of which (when  $a=1$ ) was chosen as our illustration at the beginning of this article. This relation  $1 + \Delta = e^{aD}$  gives us a very great power of converting series which contain differences into those containing differentials, and *vice versa*.

We now propose to interpret  $D^{-1}$ . This symbol must satisfy  $DD^{-1}\phi x = \phi x$ , and  $D^{-1}D\phi x = \phi x$ , the first of which is satisfied by  $D^{-1}\phi x = \int \phi x dx + C$ , where  $C$  may have any constant value: but the second is only satisfied by  $\int \phi x dx$ , beginning at a value of  $x$  which makes  $\phi x = 0$ . We shall however see that we need not enter on this question in reference to the theorem immediately following.

Let it be required to express  $\Delta^{-1}\phi x$ , or  $\phi(x-a) + \phi(x-2a) + \dots$  *ad inf.*, by means of operations of the differential and integral calculus. Since  $\Delta$  is  $e^{aD} - 1$ , we have to find  $(e^{aD} - 1)^{-1}$  expanded in powers\* of  $D$ . Now common algebraical processes show that  $(e^t - 1)^{-1}$  can be developed in the series

$$\frac{1}{t} - \frac{1}{2} + B_1 \frac{t}{2} - B_2 \frac{t^2}{2.3.4} + B_3 \frac{t^3}{2.3.4.5.6} - \&c.,$$

where  $B_1, B_2, B_3, \&c.$ , are the NUMBERS OF BERNOULLI,† of which an ample stock is given in the article cited: thus

$$B_1 = \frac{1}{6}, B_2 = \frac{1}{30}, \&c. \text{ Write } aD \text{ for } t, \text{ restoring } \phi x, \text{ and}$$

for  $D\phi x, \&c.$ , write  $\phi'x, \&c.$ , but for  $D^{-1}\phi x$ , write  $\int \phi x dx + C$ . We have then

$$\phi(x-a) + \phi(x-2a) + \phi(x-3a) + \dots \text{ ad. inf.}$$

$$= \frac{1}{a} \int \phi x dx + C - \frac{1}{2}\phi x + \frac{B_1 a}{2} \phi'x - \frac{B_2 a^2}{2.3.4} \phi''x + \dots$$

The determination of the constant might in many cases be troublesome, but if we only want a finite number of terms of the series, we can avoid it altogether as follows. Let  $x-na = y$ , and suppose that  $\phi(x-a) + \dots$  ending with  $\phi(x-na)$  is sought. Write  $y$  instead of  $x$  in the preceding, remembering that  $y-a = x-(n+1)a, \&c.$ : subtract the result thus obtained from the preceding, and we have

$$\phi(x-a) + \phi(x-2a) + \dots + \phi(x-na) \\ = \frac{1}{a} \int \phi x dx - \frac{1}{a} \int \phi y dy - \frac{1}{2}(\phi x - \phi y) + \frac{B_1 a}{2}(\phi'x - \phi'y) - \dots$$

But  $\int \phi x dx - \int \phi y dy$  is  $\int \phi x dx$  taken from  $y$  to  $x$ , or if  $\phi, x$  differentiated give  $\phi x$ , it is  $\phi, x - \phi, y$ .

For further developments of the results of this subject, see the Appendix to the Translation of Lacroix; Herschel's 'Examples of the Calculus of Differences'; Lacroix's large work on the Differential Calculus, vol. iii.; 'Library of Useful Knowledge—Differential Calculus'; a paper by Mr. Murphy in the Phil. Trans. for 1837; and various papers in the numbers of the 'Cambridge Mathematical Journal.' In several of these works further references will be found. The student may make an attempt at the demonstration of the following theorem a test of his understanding the method which we have explained, and the points of analysis which are most essential as preliminaries. Whatever  $a$  may be, the differential coefficient of  $\phi x$  is an algebraical equivalent of the following series:

$$\frac{\phi(x+a) - \phi(x-a)}{a} - \frac{\phi(x+2a) - \phi(x-2a)}{2a} \\ + \frac{\phi(x+3a) - \phi(x-3a)}{3a} - \dots$$

Instead of supposing  $\phi x$ , a function of  $x$  only, to be the fundamental subject of operations, we might make it  $\phi(x, x)$  and suppose  $E$  and  $E'$  to represent the operations of changing  $x$  into  $x+a$  and  $x$ , into  $x, +a$ . We can only

\* We transfer this word, with extension of meaning, to the calculus of operations.

† We have examined these numbers, and find them to contain no variation from the authorities cited.

briefly note some of the results of this extension. If  $D$  and  $D_x$  represent the operations of differentiation with respect to  $x$  and to  $x_x$ , we have in

$$EE_x = e^{aD+a_xD_x} = 1 + (aD+a_xD_x) + \dots$$

the means of obtaining the common extension of Taylor's Theorem to a function of two variables. Again, if we take  $\phi x \psi x$ , and let  $D$  and  $D_x$  represent operations of differentiation, which separately affect  $\phi x$  and  $\psi x$ , we have in the development of  $(D+D_x)^n \phi x \psi x$ , the formula for forming the  $n$ th differential coefficient of the product.

Since writing the above, we have found in the collection of Abel's works (vol. ii, p. 7) a paper in which this subject is treated on a foundation which, though limited, is peculiar and elegant. It is a theory of generating functions, in which

$$\phi x \text{ being } = \int e^{xv} f v \cdot dv,$$

the limits being fixed,  $f$  is called the *determinant* of  $\phi$ . The legitimacy of the separations made in this article is very easily deduced.

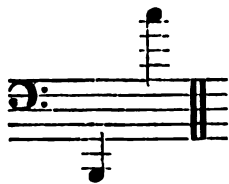
**OPERCUL'FERA**, one of the families of Polyparia Membranacea of Blainville, also called Eschariæa. [POLYPIARIA MEMBRANACEA.]

**OPERCUL'NA**. [FORAMINIFERA, vol. x., p. 348.]

**OPERCULUM** (Malacology). The plates or pieces which protect the apertures or exposed parts of certain mollusks. In many of the testaceous gastropods it becomes a cover or door, which fits the aperture of the shell more or less accurately when the animal has retired within it. *Opercula* of this kind vary much in structure and shape. Thus they are sometimes horny, as in *Trochus* and *Murex*; sometimes shelly, nay almost stony, as in *Turbo*; and in construction they are for the most part either spiral, concentric, or unguiculated. The *opercula* or opercular valves of the Cirrhipeds are figured and described in the articles *BALANUS* and *CIRRIPEDA*.

**OPERCULUM**. In Botany this term is chiefly used for the cap which forms the upper extremity of the theca, or sporangium, of a moss, covering over the peristome, and usually falling off when the spores are ready for dispersion. [MOSSSES.] It has also been applied to the lid which covers in the Pitcher of *Nepenthes*, where it is the lobe of a modified leaf. [PITCHER PLANTS.]

**OPHICLEIDE** (ὄφις, a serpent or snake, and κλεις, a key), a musical instrument of the inflatile kind, made of brass or copper, and intended to supersede the Serpent—of which it is a decided improvement—in the orchestra and in military bands. It is a conical tube, the longest nearly nine feet in length, terminating in a bell, like the horn. It has ten ventages, or holes, all of which are stopped by keys, similar to those of the bassoon, only of larger dimensions, and is furnished with the same kind of mouth-piece as the Serpent. The scale of the base Ophicleide is from  $b$ , the third space below the base staff, to  $c$ , the fifth added space above it,—



including every tone and semitone within this compass. Music for the Ophicleide is written in the base clef; for the alto, or *ophicleide quint*, in the treble clef. When the two instruments play together, the music for the alto is written an octave higher than that for the base.

The Ophicleide is quite a new invention, ascribed to M. Halary. It was used in the military bands of the northern sovereigns, when the troops of the allies occupied Paris. M. Labbaye, a manufacturer of musical instruments in that city, added new keys to it, and otherwise much extended its capabilities; besides which, he discovered a better mode of constructing the tube than had been practised, and thus greatly ameliorated its tone. These improvements were reported to the French Society of Arts in 1821, by M. Francœur, in consequence of which Labbaye obtained a patent for five years. The Ophicleide first reached England in 1834, one of extraordinary dimensions

having been manufactured abroad for the Birmingham Musical Festival of that year. In the *Supplement* to the *Musical Library* for November, 1834, it is thus mentioned: 'A new instrument, the *Double-Bass Ophicleide*, made for this festival, and now first introduced into England, proved eminently serviceable in the choruses, and whose strength was required. The volume of sound it emits is immense, but the tone is rich, round, and blends well with the voices. We are much deceived if this instrument is destined to operate a great change in the constitution of our orchestras: well played, it will answer the purpose of four double-bases, and is well calculated to form a third part to the bassoons, which has long been a desideratum. As a contra-basso to the trombones, it will not be found less useful.' This prognostic has proved correct; the instrument is now become indispensable.

**OPHIDIANS**. [SERPENTS.]

**OPHIO'DES**, Wagler's name for a genus of *Scincoides* Lizards (*Pygopus*, Spix; *Bipes*, part. Cuvier; and *Pseudactylus*, Fitzinger and Wagler—according to MM. Duméril and Bibron). [SCINCOIDEANS.]

**OPHIO'MORUS**, a genus established by MM. Duméril and Bibron for a form placed by them in their first subfamily (*Saurophthalmes*) of *Scincoides* Lizards.

*Generic Character*.—Nostrils lateral, each opening between two plates, viz. the nasal and superonasal. Tongue flat, arrow-headed in shape, scaly, and slightly notched at the point. Teeth conical, obtuse, and erect. Palate not toothed, and with a longitudinal groove. Body anguiform. Tail long, rounded, and pointed. Scales smooth.

This genus is distinguished from the *Orvets* (*Anguilla* 1st, by their teeth, which are not so long in proportion nor so slender, neither are they directed backwards; 2d, by the tongue, which is hardly notched at the point, and only offers a transverse furrow near its anterior extremity. It is furnished with only one sort of papillæ over its whole surface, and they are flattened and imbricated from before backwards like scales; 3rd, by their nostrils, which do not terminate in the middle of a small plate, but between the nasal and superonasal, which are rather large. There is a *meatus auditorius*, but as small and as difficult to perceive as that of the *Orvets*.

Example, *Ophiomorus miliaris*. Total length 15". Yellow above, grey at the sides, lower parts whitish with many rows of very small black points; those on the sides being generally more dilated and thicker together than those on the back and belly.

*Localities*.—The *Morea* and 'Algérie' (Duméril and Bibron, who add however that they know that this form, like many other Herpetological productions of those countries, is found in South Russia, where it was observed by Pallas).

**OPHIOPHTHALMES**, the name assigned by MM. Duméril and Bibron to their second subfamily of *Scincoides* Lizards, having all naked eyes, but only one of them (*Gymnophthalmus quadrilineatus*) being completely without the eyelid. In the others there exists a rudiment surrounding the orbit either entirely or in part, under the form of a ring or demi-ring, often very narrow and immovable, sometimes rather enlarged at the upper part, and susceptible of being folded back under the orbital border, or of advancing a little upon the eye-ball, as in some species of *Ablepharus*. The genera placed by the authors above quoted under the *Ophiophthalminae* are few, and the species not numerous. The former are *Ablepharus*, *Gymnophthalmus*, *Lerista*, *Hysteropus*, and *Lialis*.

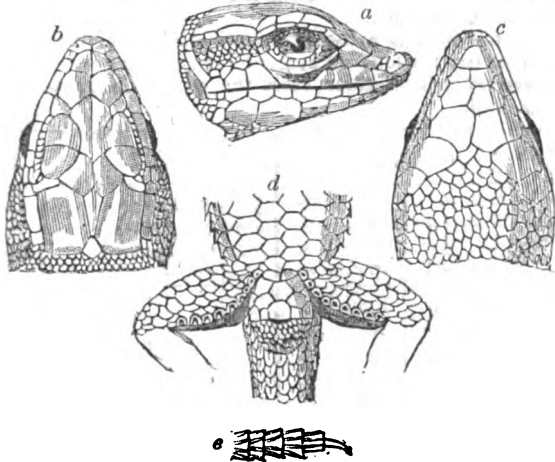
**O'PHIOPS**, a name given by M. Méneziéris to a genus of Lacertians (*Pristidactyle Colodonta* of Duméril and Bibron, *Amystes* of Wiegmann).

*Generic Character*.—Tongue arrow-headed in shape, moderately long, notched at the end, covered with imbricated squamiform papillæ. Intermaxillary teeth conical, simple. Maxillary teeth rather compressed, the anterior simple, the posterior tricuspidate. Two slightly convex naso-rostral plates, between which is opened the nostril situated on the line of the *canthus rostralis*. No eyelids. A tympanic membrane extended within the auricular opening. No scaly collar under the neck. A small fold in front of each shoulder. Ventral *lamellæ* quadrilateral, smooth, and disposed quincuncially. Femoral pores. Feet with five toes slightly compressed, carinated below, but not dentated laterally. Tail cycloctagonal at its root, but rounded throughout the rest of its length.

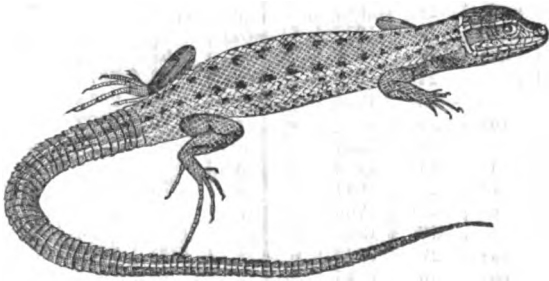
MM. Duméril and Bibron remark that the principal character of this genus is the absence of eyelids, a conformation which distinguishes it from all the other known *Pristidactyle Cælodonts*.

Example, *Ophiops elegans* (Mén.)—*Amystes Ehrenbergii*. Wieg. Olive or bronzed above. Two yellowish lines extend along each side of the trunk; each of these yellowish or whitish lines separates two rows of black spots, which are small and very distinct in young individuals, but are more or less dilated and confused in adults. White below.

Locality.—Smyrna; Bakou.



a, head of *Ophiops* (profile); b, same, seen from above; c, throat and lower jaw; d, lower part of the body, interior surface of the thighs, &c.; e, under side of a posterior toe.



*Ophiops elegans*.

**OPHIR** (אֹפִיר), a place which was known to the He-

brews and to the neighbouring nations, as early as the time of Job, as producing such an abundance of excellent gold, that 'the gold of Ophir' became a proverbial expression for fine gold. (1 *Chron.* xxix. 4; *Job*, xxii. 24; xxviii. 16; *Psalms*, xlv. 9; *Isaiah*, xiii. 12.) The position of this place is very difficult to determine. We are informed that Solomon, in conjunction with Hiram, king of Tyre, sent a navy from Ezion-geber, at the head of the Red Sea, to Ophir, and that this navy returned bringing four hundred and twenty (in *Chronicles* 450) talents of gold, sandal-wood (called in our translation almug or algum trees), and precious stones (1 *Kings*, ix. 26-28; x. 11, compared with 2 *Chron.* viii. 17-18; ix. 10): and also that Jehoshaphat built ships of Tarshish to go to Ophir for gold (in *Chronicles* it is said that he built ships to go to Tarshish), which were wrecked at Ezion-geber. (1 *Kings*, xxii. 48, 49, compared with 2 *Chron.* xx. 36, 37.) We are also told in 1 *Kings*, x. 22, that Solomon had at sea a navy of Tarshish with the navy of Hiram; once in three years (or every third year) came the navy of Tarshish, bringing gold and silver, ivory, and apes, and peacocks.

Now since both Solomon and Jehoshaphat built the navies bound for Ophir at Ezion-geber, at the head of the Red Sea, it is clear that we must seek for Ophir somewhere on the shores of the Indian Ocean, for it is highly improbable that Solomon's ships went farther than the Cape of Good Hope in one direction, or than the Indian Archipelago in the other: it is not likely indeed that they went so far either way. Nearly all the inquiries into the position of this place have proceeded on the assumption that

the passage in 1 *Kings*, x. 22, refers to the same navy which is spoken of in 1 *Kings*, ix. 27, 28, &c., and consequently that Tarshish and Ophir were visited in the same voyage. It has therefore been necessary for those who make this assumption not only to find a place which suits the description of Ophir, and which produces 'gold, sandal-wood, and precious stones,' but also to account for the 'silver, ivory, apes, and peacocks,' which were brought by the navy of Tarshish, and for the three years consumed in the voyage. But Tarshish was probably the same place as Tartessus in Spain, and therefore, if Tarshish and Ophir are to be connected, we must make the gratuitous supposition that there was another Tarshish in the East. [TARSHISH.] Besides, Tarshish and Ophir are not mentioned together in the account of Solomon's voyages; the ships that went to Ophir (1 *Kings*, ix. 28) seem to have made only a single voyage for the purpose of fetching a specified quantity of gold, while the 'navy of Tarshish' which 'the king had' (not going to Ophir, but) 'at sea' made its voyage every three years; and moreover the products of the voyages were different, gold being the only article common to the two. For these reasons we think Major Rennell correct in saying 'that two distinct kinds of voyages were performed by these fleets: that to Ophir from the Red Sea; and that to the coast of Guinea' (or to Tarshish, wherever it was) 'from the Mediterranean.' (Rennell's *Geography of Herodotus*, vol. ii., p. 353.) The conjoint mention of Ophir and Tarshish in the account of Jehoshaphat's navy admits of easy explanation; either there may be some mistake in the account in 2 *Chron.* xx. 36, 37, which differs materially from that in 1 *Kings*, xxii. 48, 49, or 'Tarshish' in the former passage may mean only 'a distant voyage,' and we know that the phrase in the latter passage, 'ships of Tarshish,' is frequently used in the Old Testament for large strong ships. The question therefore as to the position of Ophir must not be encumbered with any considerations that refer to Tarshish. The principal conjectures on the subject are the following:—

1. That Ophir was in India. This was the opinion of Josephus. (*Antiq.*, viii. 6. 4.) A town Σουπάρα (the Οὐπάρα of Arrian), at or near Goa, is mentioned by Ptolemy, Ammianus, and Abulfeda; and Sophir was the ancient Egyptian name of India. The Septuagint translates Ophir by Σουφίρ, Σωφίρ, Σωφάρα, and similar words. This opinion is held by Vitringa, Reland, and others.

2. John dos Sanctos (a Portuguese friar quoted in Purchas's 'Pilgrims'), who is followed by Bruce, D'Anville, and Robertson, places Ophir at Sofala, on the eastern coast of Africa, opposite Madagascar, chiefly on the ground of a supposed resemblance in the name.

3. Some place it on the Persian Gulf, but on very insufficient grounds.

4. The most probable opinion is, that Ophir was in the south of Arabia. It is mentioned in connection with the names of Arabian tribes in *Gen.* x. 29. The 'gold of Ophir' is mentioned in the book of *Job*, which is most probably of Arabian origin. The products of the voyage might easily have been obtained from Arabia, for though gold is not found there now, we have the testimony of several ancient writers that it was in ancient times. It is however very probable that Ophir was an emporium of the Phœnicians for their eastern trade; if so, the difficulty as to the productions is removed. This opinion is held by Michaelis, Gesenius, Vincent, Rosemüller, and most modern historians.

(Gesenius's *Hebrew Lexicon*; Winer's *Biblisches Realwörterbuch*; *Pictorial Bible*, vol. ii., p. 347, 364.) [ARABIA, vol. ii., p. 214; HINDUSTAN, vol. xii., p. 222.]

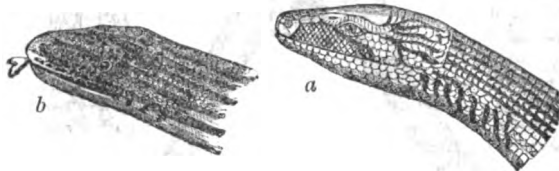
**OPHISAURUS**, Daudin's name for a genus of reptiles (*Hyalinus* of Merrem) nearly allied to the *Scheltopusiks* (*Pseudopus*, Merrem), and, according to Cuvier, one of the subgenera of the *Anguidae*. [BLINDWORM, vol. iv., p. 528.] The genus is placed by MM. Duméril and Bibron among the *Psychopleures* the first subfamily of their *Chalcidian Lizards*.

**Generic Character.**—Tongue arrow-headed in shape, notched triangularly in front, free for one-third of its extent anteriorly, which part has granular papillæ, whilst the other two posterior thirds exhibit filiform papillæ. Many rows of palatal teeth. Intermaxillary teeth conical. Maxillary teeth subcylindrical, simple. Nostrils lateral, each with its opening in a single plate. External orifice of the ear very small. Eyelids; cephalic plates numerous. Body serpentiform. No vestige of limbs externally. Two rather

deep lateral furrows. No fold across the lower surface of the neck.

This form is one of those transitions by which nature passes from one type to another. The animal, in effect, has the head of a Lizard on a serpentine body. There appears to be but one species, viz. *Anguis ventralis*, Linn.; *The Glass Snake*, *Cæcilia maculata*, Catesby.

*Description*.—Colour yellowish green, spotted with black above. Tail longer than the body. Head very small, and the tongue of a singular form, according to Catesby.

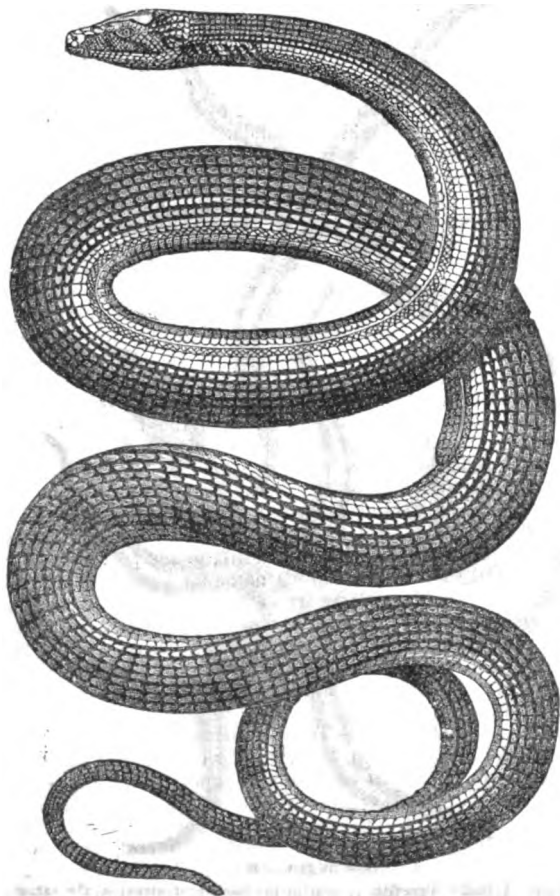


a, Head of *Ophisaurus ventralis*; b, head of the same from Catesby, showing the tongue.

It is probable that this species is subject to slight variations of colour. Catesby says that the 'upper part of the body is of a colour blended brown and green, most regularly and elegantly spotted with yellow; the belly yellow, the undermost part of which is brightest. Their skin is very smooth and shining, with smaller scales more closely connected, and of a different structure from other serpents.' General length about eighteen inches.

The fragility of this animal equals if it does not exceed that of the Blindworm; and hence, probably, its name of *Serpent de Verre*, or *Glass Snake*. The author last quoted says, 'a small blow with a stick will cause the body to separate, not only at the place struck, but at two or three other places; the muscles being articulated in a singular manner, quite through to the vertebræ. They are generally said to be harmless.' There is no doubt that the species is innocuous.

*Geographical Distribution*.—The Southern United States. Catesby states that the Glass Snakes appear earlier in the spring than any other serpent, and that they are numerous in the sandy woods of Virginia and Carolina.



*Ophisaurus ventralis*.

**OPHIU'CHUS** (the Serpent-bearer), one of the old constellations, representing a man holding a serpent, which is twined about him. But the moderns make a separate constellation of the serpent. [SERPENS.] Ophiuchus has also been called Anguitenens and Serpentarius. The figure of the man rests his feet upon the back of Scorpius, and is surrounded by Scorpius, Libra, Bootes, Corona, Hercules, and Aquila. It is not a constellation of any note, containing no star of the first, and one only of the second magnitude. The number and insignificance of the mythological traditions connected with it are rendered less surprising by this paucity of remarkable stars, since the latter is a presumption that the constellation itself is of a later date than Orion or Ursa Major.

The following is a list of the principal stars: it will be observed that the letters  $\alpha$ ,  $\beta$ ,  $\gamma$ , and  $\delta$ , have been given twice; the second is in all three cases the star so designated by Flamsteed.

Character. (Not in Bayer.)	No. in Catalogue of		Magnitude.	Character. (Not in Bayer.)	No. in Catalogue of		Magnitude.
	Flamsteed. (Piazzi.)	Astron. Society.			Flamsteed. (Piazzi.) [Bradley.]	Astron. Society.	
$\delta$	1	1859	3	$\alpha$	49	2000	5
$\epsilon$	2	1869	3½	$\beta$	51	2005	6
$\nu$	3	1884	5	$\gamma$	52	2017	6
$\psi$	4	1874	5	$\delta$	53	2015	6
( $\rho$ )*	5	1877	5	$\alpha$	54	2014	6
$\chi$	7	1882	6	$\mu$	55	2017	2
$\phi$	8	1891	4	(D) $\delta$	57	2021	6
$\omega$	9	1893	5	$\beta$	58	2032	6
$\lambda$	10	1894	4	$\gamma$	60	2036	3
$\zeta$	12	1901	6	( $\alpha$ )	62	2045	4
( $\iota$ )	13	1902	3	$\gamma$	63	2049	6
( $u$ )	16	1912	6	$\nu$	64	2055	4
( $r$ )	18	1917	6½	( $n$ )	66	2064	4½
	20	1920	5½	$\alpha$	67	2066	4
	21	1923	6	( $k$ )	68	2072	4
	22	1928	7	$\tau$	69	2075	5
( $q$ )	23	1931	5½	( $p$ )	70	2082	4
	24	1936	7	( $S'$ )	71	2089	6
$\epsilon$	25	1932	4	( $S''$ )	72	2090	4
( $x$ )	26	1941	6	( $q$ )	73	2092	6
$\kappa$	27	1940	4	( $r$ )	74	2108	6
	28	1946	6		(33)	1974	6
( $s$ )	29	1944	6		(43)	1978	6½
( $p$ )	30	1945	6		(90)	1995	6½
	32	1953	6		(99)	1998	5½
	34	1955	6		(112)	2004	6
$\eta$	35	1961	3	$\lambda$	(127)	2006	6
A	36	1967	5½		(195)	2033	7
	37	1966	6		(203)	2034	6
$\alpha$	39	1973	6		(232)	1934	6
$\xi$ †	40	1981	4		(248)	1939	6
( $\alpha$ )	41	1975	4½		(251)	1942	7
$\theta$	42**	1986	3½		(277)	1951	6
( $y$ )	43	1988	6		(289)	1956	6
$\beta$	44	1993	5		(297)	1958	6½
$d$	45††	1994	6		(303)	1959	6
	47	1997	6		[2070]	1856	6

**OPHIU'RA**, Lamarck's name for a genus of Star-fishes. M. de Blainville makes it the first genus (*Euryale* being the other) of his *Asterophydeæ*, or more correctly, *Asterophidia*, the second family of his *Stellerideæ* (*Asterias*, Linn.)

#### ASTEROPHIDIA.

*Body* small, disciform, very much flattened, the circumference furnished with appendages more or less elongated, serpentiniform, squamous, and without inferior furrows.

The organization of this family differs in many points

\*  $\gamma$  of Flamsteed.

† Erroneously called  $\rho$  by Flamsteed.

‡ Called  $\alpha$  by Flamsteed, but probably  $\epsilon$  of Bayer.

§ This letter was given because Flamsteed had erroneously supposed it to be  $\delta$  of Bayer.

|| Neither this nor any other star agrees with A in Bayer's map.

¶ Flamsteed's 38 Ophiuchi is also his 31 Scorpii.

\*\* Does not agree with Bayer.

†† 46 Ophiuchi of Flamsteed does not exist, but is an error of computation.

‡‡ 65 of Flamsteed was either a mistake or has disappeared.

from that of the true *Asteria*; and there is also a difference in their habits.

### Ophiura.

**Body** discoid, depressed, rather small, subquincelobate, covered with a coriaceous skin, and provided at its circumference with five simple, very long, very slender, squamous rays, without any trace of an inferior furrow, but always accompanied laterally with spines more or less moveable, and with two rows only of large cirri, or suckers, one on each side below.

**Mouth** in the midst of five very short slits, not exceeding the demi-diameter of the body, and furnished with a few papilliform suckers (eight), and on the edges with five groups of scales, which are often dentiform.

**Orifices** of the ovaries very large, in the shape of a slit on each side of the root of the rays.

No madreporiform tubercle. (Blainv.)

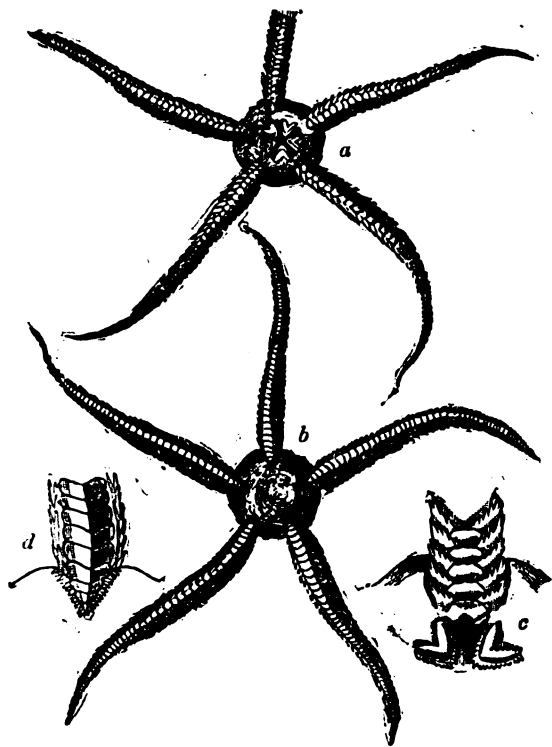
*a.*

*Species the spines of whose rays are very short and applied (appliquées).*

Example, *Ophiura texturata*. (*Stella lacertosa*, Link.)

**Description.**—Brownish or brownish white; rays smoothly subulate; the scales on the lower surface disposed trifariously; the papillæ of the sides very small and adpressed.

**Geographical Distribution.**—The European Seas. Lamarck adds the Atlantic Ocean. It was taken very abundantly in the trawl in Davis's Strait in Sir Edward Parry's first voyage; and occurs on the British coasts.



*Ophiura texturata.*

*a*, front; *b*, back; *c*, portion of centre and arm magnified (front); *d*, the same (back).

*β.*

*Species the spines of whose rays are long, and not applied.*

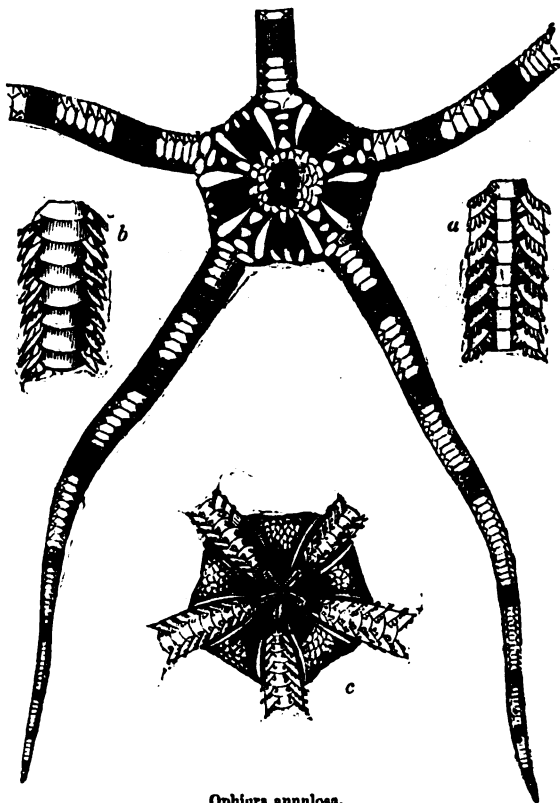
Examples, *Ophiura annulosa* and *Ophiura granulata*.

*Ophiura annulosa.*

**Description.**—Brownish, rays long, smoothly subulate, spinous at the sides, the spines annulose, and subadpressed; back of the disk echinulate.

**Geographical Distribution.**—Australasia; first made known apparently by the voyage of Péron and Le Sueur.

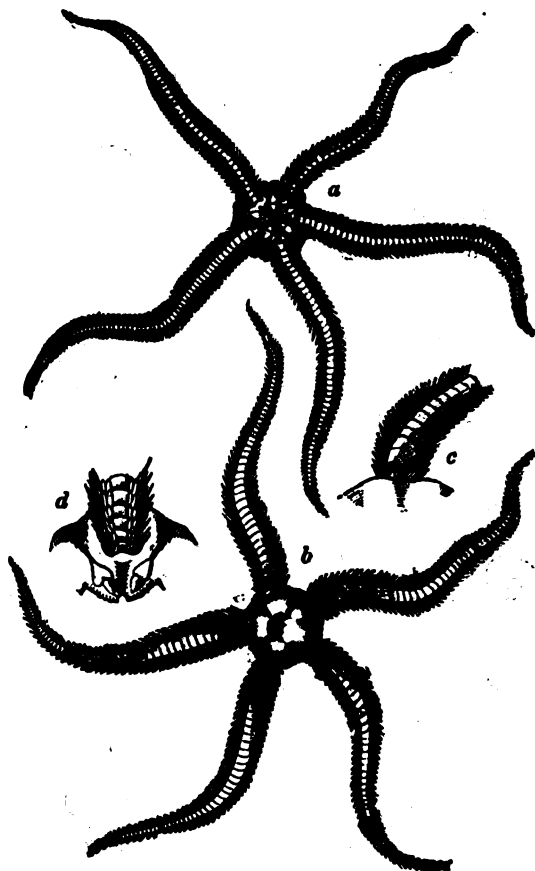
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*Ophiura annulosa.*

View of back (principal figure). *a*, Portion of arm, under side, magnified *b*, the same, upper side, *c*, front view of centre.

*Ophiura granulata* (*Ophiura echinata*, Lam., *Stella granulata*, Link.).



*Ophiura granulata.*

*a*, front; *b*, back; *c*, portion of arm at the back (nat. size); *d*, the same (front).



**Description.**—Blackish; disk granulated above; rays echinato-spinose; spines thick, rather longer than the width of the rays.

**Geographical Distribution.**—European seas, those of the West Indies, the Atlantic, &c.

M. de Blainville states that he has made observations on three species at least of this genus in the three seas which bathe the coasts of France. The genus, he observes, is evidently very distinct from that of the true *Asteriæ* both in the singular disposition of the appendages of the body and from the absence of the madreporiform tubercle. The mouth is also much more efficiently armed in consequence of the manner in which the spines or tubercles unite at the angles of the interfissural spaces of the mouth, so as to form a kind of teeth as thick as the body itself. The eggs are united in considerable oviform masses.

M. de Blainville is further of opinion that the best characters are to be drawn from the number and the length of the lateral spines of the rays, and perhaps from the proportion of these last compared with the diameter of the body; and better still by the disposition and number of the rows of plates which cover the rays. This last appears to him the most certain, and is that to which he has had recourse in his monograph.

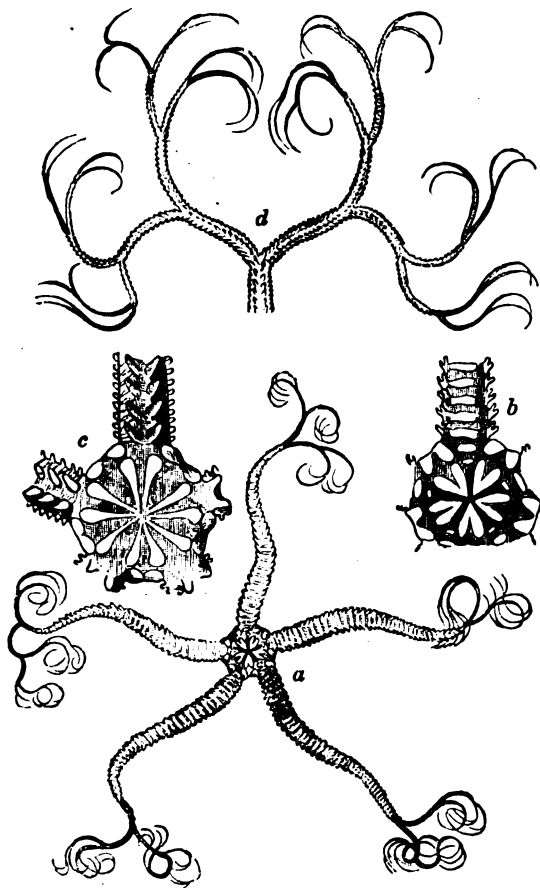
**Geographical Distribution.**—Very general; hardly any seas are without species of this genus; and there are many in those of Europe, though M. de Blainville thinks that zoologists have exaggerated the number.

**Habits.**—The *Ophiuræ* swim and creep often with much facility in all directions, agitating the appendages of the arms in a serpent-like manner.

**Euryale.** (*Astrophyton*, Link.; *Gorgonocephalus*, Leach.)

**Body** regular, depressed, rather small, pentagonal, provided with five appendages or rays rounded above, flattened below, dividing, dichotomizing, and attenuating more and more to the extremities, which are cirriform.

**Mouth** at the centre of five converging furrows, in form of holes, not extending to the circumference of the body, and bordered with papilliform suckers. (Blainv.)



*Euryale palmifera.*

a, front view; b, centre and part of arm (front—nat. size); c, the same (back—nat. size); d, extremity of one arm (nat. size).

a.

*Species whose rays dichotomize but little, and at a distance from the root.*

Example, *Euryale palmifera*.

**Description.**—Rays simple below, dichotomo-palmate at the apex; back muricated with two rows of tubercles.

β.

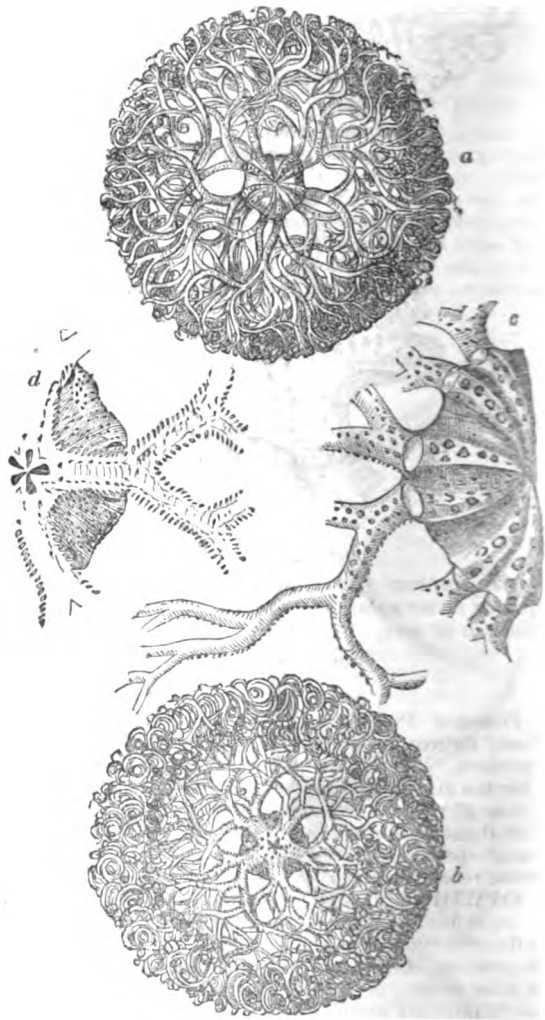
*Species whose rays are divided and dichotomized from the base or root.*

Examples, *Euryale scutata* and *Euryale costosa*.

*Euryale scutata* (*Euryale verrucosum*, Lam.; *Astrophyton scutatum*, Link.; *Asterias Caput Medusæ*, Linn.).

**Description.**—Disk wide, radiated above with warty rays beneath planulate, bifurciously papillose; papillæ very small and submarginal.

**Geographical Distribution.**—Indian seas and those of the North; said to have been taken on the coasts of Scotland.



*Euryale scutata.*

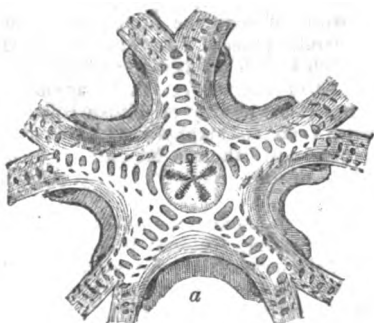
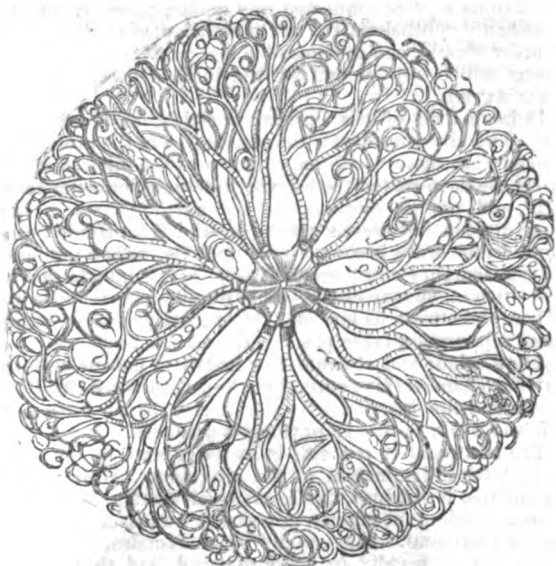
a, back; b, front; c, central portion of back (nat. size); d, the same (from nat. size).

*Euryale costosa.* (*Astrophyton costosum*, Link.)

**Description.**—Back of the disk with ten unarmed ribs, pairs, truncate at the apex; rays dichotomous, very ramose and transversely rugose.

**Geographical Distribution.**—Seas of America.

**Habits.**—M. de Blainville remarks that he knows of no author who has observed an *Euryale* alive, or at least who has published his observations; but it is nevertheless said that these animals make use of the cirrhi of their rays to entrap their prey and bring it to the mouth; that they adhere strongly by their upper disk, and that it is even difficult to detach them. We have often seen them clinging by their arms to the branches of *Gorgonia*, &c., and such specimens are to be found in most museums.



*Euryale costosa.*  
a, centre (front—nat. size).

**Geographical Distribution of the genus.**—Though the species do not appear to be numerous, the form seems to be found in all seas.

#### FOSSIL ASTEROPHIDIA. Ophiura.

Professor Phillips, in his 'Geology of the Yorkshire Coast,' figures a species (*Ophiura Milleri*, Phillips) from the marlstone. Mr. Broderip (*Geol. Trans.*, vol. v., 2nd series) describes and figures another (*Ophiura Egertoni*), found in masses of micaceous sandstone which had fallen from the cliffs about half a mile west of Bridport harbour. The last-named species, Mr. Broderip states, approaches very nearly to the recent *Ophiura texturata*.

**OPHTHALMIA** (from *ophthalmos*, ὀφθαλμός, the 'eye') is an inflammation of the eye. General ophthalmia, or an inflammation of the whole globe of the eye, is a very rare occurrence. Cases however do occur, from severe injuries or other causes, in which the signs of all the special forms of ophthalmia are combined, and they are the most formidable affections to which the eye is liable. Unless met by the most active antiphlogistic treatment, they usually terminate in complete destruction of the organ.

In the large majority of inflammations of the eye, one part of it is alone or especially affected. Hence there have been described numerous varieties of ophthalmia, a distinct name being formed for the inflammation of each part or tissue by appending the termination *itis* to its anatomical name; as conjunctivitis, iritis, and corneitis, for the inflammations of the conjunctiva, iris, and cornea. [EYE.]

Of all the varieties of ophthalmia, slight inflammation of the conjunctiva is the most frequent. It is the common result of all slightly irritating bodies being introduced between the eyelids, and of the application of cold, in which case it is often called catarrhal ophthalmia. Its symptoms are redness, varying from a pale-pink to a scarlet colour, of the external membrane of the eye and of the lining of the

eyelids, the blood-vessels (which are naturally invisible) appearing swollen and tortuous, and making the front of the eye what is commonly called blood-shot; swelling of the eyelids and increased thickness and puffiness of the conjunctiva of the ball; and an increased secretion of opaque white or yellow tenacious mucus which agglutinates the eyelids. The pain is seldom acute, except in severe cases, in which it has a peculiar character, as if there were dust or fine sand rubbing between the eyelids. There is rarely any intolerance of light or any constitutional affection, and the vision is not at all affected, except by the swelling of the eyelids and the accumulated mucus.

In this, the common inflammation of the eyes, no active means need be employed. In the most severe cases, blood should be taken from the arm; but in general, the application of leeches, cooling lotions applied to the eyes, and mild purgatives or sweating medicines, are sufficient for the removal of the inflammation, which, as it does not affect a part directly important to vision nor spread beyond the tissue first affected, rarely leaves any inconvenience behind. In the mild cases of this kind, a lotion composed of two grains of sulphate of zinc to the ounce of water is the best, and generally a sufficient remedy; the eyes should be washed with it three times a day.

That which is commonly called purulent ophthalmia is a much more serious form of inflammation of the conjunctiva. It was observed in its greatest severity in the European armies engaged in Napoleon's campaign in Egypt, and is therefore sometimes called Egyptian ophthalmia; and from its appearing to spread from one individual to another by the contact of the purulent matter secreted by the inflamed eyes, it has also received the name of contagious ophthalmia. In this form, which has often appeared as an epidemic,\* and is generally acknowledged to be liable to spread by contagion, all the symptoms of the preceding are greatly aggravated. The conjunctiva is intensely red, and so swollen that it is raised in a deep ring round the cornea, whose edges it overlaps so as almost totally to obstruct the sight. The conjunctiva of the eyelids is at the same time excessively inflamed, and by effusion into their loose cellular tissue they often become so distended that they completely cover the front of the eye. A considerable quantity of acrid yellow puriform discharge constantly flows between the eyelids, producing excoriations of them and of the cheeks. The pain is often extremely acute, vividly smarting, or hot and burning, and it is accompanied by some intolerance of light. From the conjunctiva, which it first affects, the purulent ophthalmia often spreads rapidly to the other tissues of the eye; producing ulceration and sloughing, or excessive opacity of the cornea, and all the worst results of inflammation of the several tissues, even to suppuration and destruction of the whole of one or both eye-balls.

The treatment of this form of ophthalmia must be active in proportion to the rapidity of its destructive effects when unchecked. Large bleedings, both general and local, should be employed, and repeated till the inflammation is evidently reduced; and purgatives and the various other antiphlogistic means should be administered, as in the treatment of an acute inflammation of the most vitally important organ. When the inflammation is somewhat checked, the greatest benefit is derived from the application of powerful astringents to the eye, a mode of treatment which may be adopted with equal advantage in these and in the severer cases of catarrhal ophthalmia. The best material is a solution of from two to four grains of lunar caustic to the ounce of water; of which one or two drops should be let fall into the eyes once or twice a day, according to the severity of the inflammation. This remedy produces considerable pain for a short time after its application, but is generally productive of the most beneficial results.

One of the most common effects of the purulent ophthalmia, when prevented by active treatment from producing its worst results, is a thickening and roughness of the inflamed lining of the eyelids, to which the name of granular con-

\* A severe epidemic of purulent ophthalmia is now raging in the Belgian army. It first appeared in 1814, but it is chiefly since 1830 that it has raged with such extreme intensity as to have attacked an eighth and in some regiments half the soldiers. Since its commencement it has affected more than a hundred thousand persons, and has deprived many of their sight. (See the Report on the ophthalmia of the Belgian army, recently presented to the French Academy of Medicine, by M. Caffé, in their Bulletin of January 15, 1840.)



conjunctiva is given. The affected surface looks like that of a florid ulcer, and the friction of its irregularities upon the front of the eye-ball keeps up a constant slight inflammation, of which the common consequence is a complete opacity of the cornea. The granular conjunctiva may be treated by the application of powerful astringents or caustics; the most efficient, though a severe remedy, is to rub the rough surface with a piece of sulphate of copper, taking care after its application that no considerable portion of it comes in contact with the front of the eye.

Infants of three or four days old are often the subjects of a very severe form of inflammation of the conjunctiva, to which the name of the ophthalmia of new-born children has been given. Its course and effects are similar to those just described, and it sometimes produces entire destruction of the eye before it attracts proper attention, for the eyelids are commonly agglutinated together by the discharge, and are so swollen that they obscure the front of the eye. Its severest form may be suspected when the upper eyelid is much swollen and is externally of a bright red colour. The treatment must be similar in its principles to that for the corresponding disease in the adult; in severe cases a leech should be applied to the temples and purgatives should be administered in all; and when the inflammation is somewhat relieved, or from the first, if it be not very severe, astringent lotions should be dropped into the eyes. The best form is composed of from two to ten grains of alum in an ounce of water, beginning with the smaller quantity and gradually increasing the strength.

Another form of inflammation of the conjunctiva is that called strumous ophthalmia. It occurs in children of scrofulous habit, and is chiefly remarkable for the extreme intolerance of light by which it is accompanied. The patient cannot be induced to open the eyes, or even to raise them to the light, but keeps his head down, with the eyelids pressed together upon the ball of the eye, and carefully covered with his hands or his clothes. The degree of inflammation is by no means proportionate to the severity of this symptom; the conjunctiva is usually only a little reddened, but in many cases little pustular elevations form upon the edges of the cornea. The treatment of these cases should be chiefly that adapted for the constitutional disorder on which their peculiarities depend. [SCROFULA.] Pure air and exercise, mild aperients and tonics, and especially bark and iodine, should be administered, and the general health should be carefully attended to. In the earlier stages a few leeches may be applied, but afterwards counter-irritation by blisters placed behind the ears, or by tartar-emetic ointment rubbed on the same parts, is most useful. Slightly astringent lotions may also be applied to the eyes, and the ulcers or little pustules on the cornea touched with the solid nitrate of silver (lunar caustic).

The characters of inflammation of the sclerotica are very different from those of inflammation of the conjunctiva, but very often the two affections are coincident, so that the appearances belonging to each are confounded. In scleritis, as this form of ophthalmia is sometimes called, the redness of the eye has a rose-pink or violet tinge, rather than the scarlet hue which is seen in the preceding form; for the distended vessels are fewer and smaller, and are to a certain extent obscured by the conjunctiva, beneath which they lie. This redness is most intense in a zone around the cornea, at which the enlarged vessels are concentrated like rays, and from whose outer border the redness diminishes in brightness till it is nearly lost at the angles of the eye; and by this circumstance scleritis is further distinguished from inflammation of the conjunctiva, in which the redness increases with the distance from the cornea. In scleritis there is always considerable pain of a dull heavy kind, which often extends all round the orbit, or over the forehead and head, and is accompanied by intolerance of light and a profuse secretion, not of mucus or pus, as in the preceding cases, but of hot tears. The pain is very often aggravated in the evening, or throughout the night.

The treatment of inflammation of the sclerotica must, as far as general means are concerned, be the same as for acute inflammation of the conjunctiva. The application of astringents or stimulants is useless, and sometimes injurious; the vapour of hot water and other warm fomentations are the local means which are most agreeable to the patient. The moderate use of mercury is generally useful. In rheumatic and gouty conditions of the system, with which this form of

ophthalmia is often connected, and is then called rheumatic or arthritic ophthalmia, the treatment adapted to the general disorder should, as far as possible, be combined with those means which are proper for the local disease. [GOCT. RHEUMATISM.]

Inflammation of the cornea, corneitis, or keratitis, is very generally connected with some degree of the preceding. Its signs are those which are common to the inflammation of all the deep-seated tissues, viz. dull pain, intolerance of light, and profuse discharge of hot burning tears; at the same time a few vessels passing inward from the red zone around the cornea become visible upon its surface; it loses its transparency and becomes hazy, or assumes a greyish and often an opaque chalky-white hue, from the deposition of lymph between its laminae. [LEUCOMA.] In very severe cases suppuration takes place in the cornea, and it acquires a yellow colour and ulcerates; or matter is poured into the anterior chamber [HYPOPIUM], or the cornea is perforated by ulcers and the iris protrudes; or it sloughs and becomes soft and weak, so that staphyloma is produced.

The treatment of corneitis in its active state is the same as that for inflammation of the sclerotica. After the inflammation is subdued, its effects (which the situation of the cornea renders peculiarly important) admit of but little useful treatment. The opacity which remains, when it is superficial, is usually gradually removed, and that process may be in some degree assisted by the application of a weak solution of nitrate of silver or some other stimulant; the ulcerations generally proceed best when left to themselves, the chasms which they leave being gradually filled up, and the yellow tinge of the cornea which accompanies them being exchanged for a grey or bluish colour; the more serious effects, such as staphyloma, extensive leucoma, sloughing, protrusion of the iris, &c., are irremediable.

Inflammation of the iris has already been treated under [IRIS.]

Inflammation of the membrane of the aqueous humours not uncommon in young persons; it is marked by dulness and haziness of the cornea (which is surrounded by the vascular red zone formed by the distended vessels of the sclerotica), an alteration in the colour of the iris, which assumes a dull reddish hue, and a turbid or purulent appearance of the aqueous humour, with, in some cases, *hypopium*. The proper treatment does not differ essentially from that of inflammation of the iris or sclerotica, with which this form of ophthalmia, like all the affections of the deep-seated tissues of the eye, is very generally conjoined.

The inflammations of the parts of the eye which are still more deeply seated are much rarer than any of the preceding; their symptoms also are more obscure, and they are seldom found uncombined with those of some other form of ophthalmia. Their signs are similar to those of the inflammations of the sclerotica and cornea; but the intolerance of light and the loss of vision are usually greater than would arise from the degree of inflammation which exists in the visible tissues. The treatment must be similar to that for the acute inflammation of the iris or cornea, and be actively administered for the nature of the parts affected renders the least disorganization of them of the highest importance.

All kinds of ophthalmia may either become chronic after having existed for some time as acute diseases, or may be chronic from their commencement. Their symptoms in either case differ only in degree from those of the corresponding acute forms, and the treatment of them should be the same in principle, though less active. Counter-irritation by blisters or other means, applied to the neighbourhood of the eyes, or setons in the back of the neck, are among the most useful means; and of the milder forms of astringent lotions, the *vinum opii* is the best for all the more superficially seated of the chronic ophthalmias.

O'PICI. [OSCI.]

OPIE, JOHN, the son of a carpenter at St. Agnes near Truro in Cornwall, in which parish he was born in 1761, was one of those artists who may be said to have been gifted with an intuitive feeling guiding them towards a destination against which all circumstances appear to conspire. In this respect there was a striking similarity between Opie and Carstens. [CARSTENS.] The humble condition of his family was the least obstacle; for besides that, there was nothing around him either to awaken his perceptions of art or to encourage his early attempts in it. Intending to bring

him up to his own trade, his father was much more disposed to check what he considered an idle boyish pastime than to foster proofs of dawning talent. Opie however was not to be deterred by his father's disapprobation; he began to take likenesses of his relations and neighbours, the fame of which productions caused him to be regarded as a prodigy, and attracted the notice of Dr. John Wolcot (Peter Pindar), then practising as a physician at Truro. The Doctor possessed considerable knowledge of painting, and took Opie into his house in the double capacity of his protégé and his footboy. How long he remained beneath Wolcot's roof is not known, nor what immediately led to his quitting it. Opie afterwards came to the metropolis under the doctor's immediate care and protection. In the time between leaving his service and coming up to town, he pursued his art as an itinerant portrait-painter, and with such success, that though his charges never amounted to the value of any gold coin, he was able not only to make a smart appearance, but to remit money to his mother.

On arriving at London with Wolcot (1781), he was introduced to Sir J. Reynolds, whom he found more liberal of advice than lavish of expressions of astonishment at the talents of an untaught lad. Wolcot's object however was to secure immediate fame for his protégé as a miraculous genius, and distinction for himself as a discriminating and generous patron.

Aware that the public are always ready to meet any novelty or wonder more than half way, the doctor took his measures accordingly, and with such success, that within a very short time his Cornish lad became almost the rage among the fashionable world. Visitors and sitters so thronged around him, that their carriages literally crowded the street where he resided. But people cannot wonder for ever: the fever of fashionable admiration subsided almost as rapidly as it had come on; not that Opie was absolutely left all at once without sitters, but he was comparatively deserted:—public curiosity had been gratified. In fact he was ill suited to become a permanent favourite with the fashionable; there was nothing engaging in his person and address, no flattery either in his language or his pencil, which latter possessed much more of vigour and homely truth than of grace and artificial refinement; and he succeeded far better with male heads and strongly marked countenances than with females and with pretty faces. When it had subsided, however, the tide of fashionable patronage left him in comfortable circumstances. He further sought to establish his independence by marrying the daughter of a wealthy pawnbroker, but the match proved a most unhappy one, and he was glad to obtain a divorce. In 1798 he ventured upon a second union, and married Amelia, the daughter of Dr. Alderson, a physician at Norwich. In this lady, who subsequently became one of the most popular novelists of the day, he found an intellectual companion and judicious adviser.

Instead of abandoning portrait-painting on the discouragement immediately following his first success, Opie divided his attention between that and historical painting, in which latter his best known productions are—'The Murder of James I. of Scotland,' the 'Death of David Rizzio,' 'Arthur taken prisoner,' 'Hubert and Arthur,' 'Belisarius,' 'Juliet in the garden,' &c. None of these works affect ideal beauty or refined poetical conception, but they are stamped by a peculiar energy of style, and by a vivid reality, for instead of attending to conventional beauties, the artist adhered closely to his models; one fortunate consequence of which was the striking and remarkable truth of his colouring.

Opie's education had been exceedingly limited, and was in no degree a literary one. Sensible of his deficiency in that respect, he sought to repair it in after-life by studying the best English authors, and having a clear judgment and a strong memory, distinguished himself in conversation by his force of intellect. Thus qualified he aspired to the professorship of painting at the Royal Academy, having previously delivered a course of lectures at the British Institution; but he withdrew on finding himself opposed by Fuseli. When the latter was obliged to resign on being appointed Keeper, Opie again offered himself as candidate, and was chosen. He delivered only four lectures (afterwards published by his widow), in the months of February and March, 1807. On the 9th of the following April he died, and was buried on the 20th in St. Paul's cathedral, near Sir J. Reynolds.

## OPILIUS. [MACRINUS.]



Coin of Opius.

British Museum. Actual size.

## OPISTHO'COMUS. [CRACIDÆ, vol. viii., p. 131.]

OPISTH, MARTIN, considered the father of modern German poetry, was born at Bunzlau in Silesia, in 1597. While at the gymnasium at Breslau, he produced several Latin poems, which were printed. On quitting Breslau, he studied successively at Beuthen, Frankfurt, and Heidelberg; and it was at the first-mentioned place that he composed his dissertation entitled 'Aristarchus, sive de Contemptu Linguae Teutonicæ,' 1618, in which he vindicates the merits of his native tongue. At Heidelberg he formed many literary friendships, and met with patrons whose attachment afterwards proved highly serviceable to him.

Having renounced his legal studies, he began to employ his pen very industriously both in Latin and German composition. Yet, whether from restlessness of disposition or some other cause, he was continually changing his place of abode. Scarcely had he been a year at Heidelberg when he quitted it for Strasburg, and in the course of a short time after (1620) visited the Netherlands, when he became acquainted with Vossius, Rutgersius, and Dan. Heinsius. The example of this last eminent scholar determined him to cultivate his native tongue with still greater assiduity, and to do for the German language and poetry what had already been accomplished in that of Holland. In the following year he accompanied his friend Heinrich Albert Hamilton, a young Dane of noble family, to Holstein; and while he was his guest composed his 'Trostgedicht,' or poem on Consolation in the Disasters of War, which however he did not publish until nearly thirteen years afterwards (1633), when war was raging in Germany. In 1622 he was invited by the Prince of Siebenbürgen (Gabriel Bethlen) to become teacher of philosophy and humanities at the school of Weissenburg. It was during his residence there that he commenced his 'Dacia Antiqua,' an historical work of great labour and research, on which he employed himself for sixteen years, but which was left incomplete, and lost when his MSS. were dispersed after his death. He returned to Liegnitz in 1623, and in the following year appeared the first edition of his poems. Not very long after he spent some time in travelling through Saxony, and subsequently proceeded to Vienna, where he was noticed by Ferdinand II., who even bestowed a laurel crown upon him for his poem on the death of the archduke, which production however was rather a triumphal song in honour of the Austrian monarchy.

In 1626 he accepted the post of private secretary to Count von Dohna, a nobleman equally eminent as a soldier, a statesman, and a scholar; and notwithstanding his patron was a Catholic, and Opitz a Lutheran, with very little taste moreover for military affairs, they lived together upon the very best footing, and the poet was enabled to gratify his passion for travelling, by accompanying the count to Paris, where he became acquainted with Hugo Grotius and other eminent literary persons. His patron dying shortly after (1633) their return from France, Opitz (who had previously had a patent of nobility conferred upon him by the emperor, with the style of Opitz von Boberfeld) met with another protector in the Duke of Brieg, who enabled him to visit Prussia, in order that he might there pursue his studies at a distance from the troubles which then agitated Germany. For some time he continued settled at Danzig, where, having recommended himself to Uladislav IV. of Poland, by a poem on his campaign against Russia—one of his most masterly and energetic productions—he was appointed Polish historiographer. But while his literary reputation was daily increasing, and his circumstances becoming more prosperous, a dreadful plague broke out in Danzig, to which he fell a victim, August 20th, 1639, in his forty-second

year. Owing to the fear of contagion, his papers and manuscripts were put away and irrecoverably lost.

His published works however sufficiently attest the important services he performed for German literature, more especially as regards the language and its mechanical structure. As a poet he can be considered great only by comparison with his predecessors and contemporaries. Though strong native good sense and amiable feelings display themselves in his productions, together with great correctness and purity of style, and occasionally great felicity of expression, there is more of the orator than of the poet in his compositions; more of elaborate study and sound judgment than impassioned feeling. Still he rendered most essential services to the literature of his country; and but for his labours in refining the language, the poets of the eighteenth century would have had to contend with nearly all the difficulties which the labours of Opitz had helped to remove. Opitz succeeded best in moral and didactic subjects, such as his 'Preis der Gemuthsruhe,' 'Vielgut,' &c. Among his lyric productions his version of the Psalms contains some of his most successful efforts. His prose style has also much merit, and recommends itself by the qualities of correctness, precision, and clearness, in which respect his translation of Barclay's 'Argenis' (1626) is a masterpiece, considering in what condition the language was at the time when it was produced.

#### OPIUM. [PAPAYER.]

**OPIUM TRADE.** The cultivation, mode of preparing, and medical properties of opium, are treated of under **PAPAYER**: in the present notice we shall confine our attention to the consumption and commerce of opium.

The principal countries in which opium is medicated are India, Turkey, and Persia. The poppy is cultivated in Egypt and Arabia; in Italy, France, and several other parts of Europe; but, with the exception of the two former countries, rather for the sake of its capsule and the oil extracted from its seeds than for the inspissated juice. Indian opium is distinguished into two kinds, the Patna, grown in the province of Bahar, and that grown in the province of Benares, the former of which is most esteemed. The opium produced in the district of Malwa is still less esteemed than that of Benares, being, it is said, not so 'pleasant,' and the flavour less 'mellow;' and the best Indian opium is inferior to that of Turkey. For some time the quantity of opium produced and brought to the Eastern markets from all parts was not equal to the demand, and the Malwa and Turkish opium were introduced to supply the deficiency. At first there was a strong prejudice against the latter. The Turkey opium was introduced into the Indian Archipelago in 1815, and the merchants reluctantly consented to its constituting one-fourth of the supply for the year; but two years afterwards they expressly stipulated for one-half, and in the following year for three-fourths, although the price rose, while Indian opium was stationary. A strong preference has also been shown in China for the Turkish opium, which has been introduced by the Americans. The annual imports of Turkey opium into China are estimated at about 1500 chests. Several thousand persons are engaged in the cultivation in Turkey. They are generally very poor, and the quantity annually brought to market by each cultivator does not usually exceed one or two baskets. The annual average produce of Turkey is estimated at 3000 baskets, or about 400,000 lbs., equal in weight to 2666 chests of the Indian opium. The whole quantity of land under the poppy cultivation in India is said not to exceed 50,000 acres, and perhaps about as many persons are employed in the cultivation. It is under a strict monopoly, and the advances made by the government are a great inducement to the peasant to engage in the cultivation. Milburn (*Oriental Commerce*, p. 294) gives the following account of the opium monopoly:— 'The monopoly in the trade of opium, or the cultivation of the poppy, may be traced at least as far back as the commencement of the British influence in Bengal. The advantages resulting from it were for several years merely considered as a part of the emoluments of certain officers under the government. In the year 1773 it was taken out of their hands, and the profit of the trade assumed for the benefit of the Company. The provision of the article was for many years let out upon contract. The opium concern continued under the direction of the Board of Revenue till 1793, when it was transferred to the Board of Trade. On the expiration of the contracts, in 1797, the cultivation of opium was restricted to Bahar and Benares, and discontinued in

Bengal: the mode of provision by agency was resorted to, and still continues in practice. In July, 1799, some regulations were published "for the guidance of all persons concerned in the provision of opium on the part of government, and for preventing the illicit cultivation of the poppy and the illicit importation or traffic in the article of opium." Under these regulations, which were further modified in 1807, the cultivation of the poppy, except on account of government, is expressly forbidden; but it is left entirely at the option of the cultivator to enter into engagements on account of government at a settled price, or to decline it altogether. The quantity grown, which is limited, is sold by public auction at two annual sales at Calcutta, in December and February. The monopoly is said in some years to have yielded 1,000,000*l*. It has not been possible to extend it to Malwa, but the East India Company grant passes for the transit of Malwa opium to the place of shipment. (Report of a committee of the House of Lords 'On the Affairs of the East India Company,' 1830.)

Opium is often adulterated with the pulverised leaves and stalks of the poppy, which are mixed up into a mucilaginous mass with gum arabic or some similar substance. Milburn (*Oriental Commerce*) gives the following directions for testing the quality and purity of opium:— 'Opium is very heavy, of a dense texture, commonly soft enough to receive an impression from the finger. It should be chosen moderately firm; its colour a very dark-brown yellow, so dark that, unless held to the light, it appears black; of a strong smell and bitter taste; as free from leaves as possible; and care should be taken, by rubbing it between the finger and thumb, that there is no roughness or grittiness. That which is soft should be rejected.' In Sumatra the opium prepared for smoking is frequently adulterated with pine-sugar, and crude opium with the fruit of the pisang, or plantain.

The East India opium is exported in chests, of 150 *lbs* each, lined with hides. The principal market is China; but it is also in demand in all Eastern countries, the Malay Peninsula, Sumatra, Borneo, Celebes, and other islands of the Indian Archipelago. In 1821, of the total quantity exported from Calcutta, three-fourths were for China and Macao, a fifth for Penang, and between a seventh and an eighth for Java. Mr. Crawford states (*Indian Archipelago*, vol. ii., p. 520) that in the islands opium sold at an advance upon the monopoly price of Bengal of 168 per cent., and upon the first cost of 3025 per cent. It is a lawful trade throughout all the islands, but the article pays a heavy duty. In Java the native princes monopolise the sale, and farm it to the European government. In 1820 the consumption of the island was about 550 chests, but varied with the annual price. Previous to 1811, under the Dutch government, the annual consumption varied from 800 to 1200 chests; but while Java was in our possession, Sir Stamford Raffles fixed it at 300 chests, without exciting any disturbance or creating an illicit trade. The opium trade is farmed in Sumatra. In Siam opium is a prohibited article; and in a commercial treaty which the Siamese entered into with the East India Company in 1833, it is declared liable to be seized and destroyed whenever found.

Mr. Davis states ('China,' vol. ii., p. 453) that an engrossing taste for opium pervades all classes in China, and that it has spread with astonishing rapidity. From the superior classes, who were the first to practise it, the habit of opium smoking has descended and become general. 'Worthless subordinates in offices and nefarious traders first introduced the abuse; young persons of family, wealthy citizens, and merchants adopted the custom; until at last it reached the common people. I have learned on inquiry, from scholars and official persons, that opium smokers exist in all the provinces, but the larger proportion of them are to be found in the government offices; and that it would be a fallacy to suppose that there are not smokers among all ranks of civil and military officers below the station of provincial governors and their deputies.' (Memorial to the Emperor, from one of the Chinese Censors.) Mr. Gutzlaff ('Journal of Three Voyages,' p. 61) says of the Chinese sailors, that most of them are smokers of opium, and that when the weather is rough, and more than ordinary attention is required from them, they turn in and intoxicate themselves with this drug; and on shore they indulge in smoking it until all their wages are squandered. The drug is prepared for smoking by being boiled or seethed to separate the resinous parts, and the remainder is made up into

small balls, one of which is placed in a wooden pipe with some combustible substance, when as many whiffs are taken as the habit of the smoker will permit. At convivial entertainments a dish of the prepared opium is often brought in with a lamp, and the host, taking up a large pipe, lights it, and after two or three whiffs, passes it to his guests, the pipe making its rounds until all are intoxicated. The whole of the tribes of the Indian Islands more frequently smoke opium than eat or chew it. They in fact chew tobacco and smoke opium, while the practice of the Turks and other people of Asia is directly the reverse. Raffles states ('Java,' vol. i., p. 112) that in this island the opium prepared for smoking is used along the coast, and crude opium is chewed by the people of the interior. He tells us that 'the use of opium, though carried to a considerable extent, is still considered disgraceful, and persons addicted to it are looked upon as abandoned characters.' (Vol. i., p. 114.) On the west coast of Celebes, the principal rajah and his family, and the various smaller rajahs amongst whom the country is divided, are the chief opium smokers, persons of inferior rank not being able to command the luxury. In Sumatra and Borneo the drug is subjected to nearly the same preparation as in China. (J. H. Moor's *Notices of the Malayan Archipelago*.) Marsden states ('Sumatra,' p. 277) that in that island the opium, after being seethed, is strained and then boiled. The leaf of the *tambaku*, shred fine, is then mixed with it, and the whole is made into pills of the size of a pea, one of which is put into the pipe, and a light being applied, it is consumed at one whiff or inflation of the lungs. In some parts of India, opium is presented at visits and entertainments in the same familiar manner as a snuff-box. The prohibition of intoxicating liquors by the Mohammedan law has, it is believed, encouraged the habit of taking opium; and in consequence of the Turks of the present day being far less bigoted than formerly, the consumption of opium is said to have declined with the more frequent indulgence in wine and arrack. The race of *Theriakas*, or habitual opium-eaters, has not however become extinct. The habit is believed to be more prevalent at present in Persia than in Turkey, though it is not often carried to the same excess. The opium stalls in the bazaars, around which the wretched and haggard victims of opium-eating assemble for their daily supply, remind the Englishman of gin-drinking in his own country.

In Europe opium is almost wholly employed as a medicine. It has been made in England from the native poppy, but the cultivation is not likely at any time to become worthy of attention on a large scale. The abuse of opium is said to have been latterly increasing in England, and the cause of this has been attributed to the Societies whose members are pledged to total abstinence from fermented and spirituous liquids; but although this statement has been made by members of the medical profession, it does not appear to rest upon any good evidence. It is said, we believe with some truth, that opium is taken for its intoxicating properties rather extensively in Lincolnshire, the practice having originated in its use as a remedy for the ague; and in the manufacturing districts in Lancashire it has been asserted that its use was rather common, but the fact is not at all well established. Laudanum, a preparation from opium, is made use of to a very great extent by ignorant and careless mothers and nurses. From a Return to the House of Commons in 1839, which however is not quite complete, it appears that out of 543 persons in England and Wales who died from the effects of poison in 1837 and 1838, and on whom inquests were held, the fatality was occasioned by opium or its preparations in not fewer than 186 cases; and nearly one-seventh (72) of the whole number of cases were young children, most of them under one year, to fifty-two of whom an overdose of opium, or some medicine of which it formed the chief ingredient, had been given, and in twenty other cases the children had been poisoned by taking such medicines by mistake. The coroner for Nottingham stated in his Return, that at a shop in that town, in which the attendants were two girls, one of them was in the habit of selling twice as much laudanum for a penny as the other. There is every reason to believe that the deaths which occur without exciting public attention, and which arise from the indiscriminate and injudicious use of cordials and other made-up medicines for children, of which opium is the basis, are as numerous as those which come under the cognizance of the coroners.

The opium consumed in this country is chiefly from

Turkey. From 1827 to 1834, the total quantity imported into the United Kingdom was 688,443 lbs., of which 581,380 lbs. were from Turkey. Opium in small quantities is a permanent article of import from Italy and France; occasionally, but in still less quantities, it is imported from Russia, Germany, Holland, and Belgium; and but rarely from India. Within the last few years Egypt has exported opium to England, and the quantity has been yearly increasing. In 1838 the total quantity of opium imported into the United Kingdom was 95,232 lbs. from the following countries:—Turkey, 80,554 lbs.; Egypt, 12,324 lbs.; Holland, 270 lbs.; France, 102 lbs.; Gibraltar, 409 lbs.; Italy, 895 lbs.; Syria, 571 lbs.; East Indies, 580 lbs. The quantity re-exported was only 13,028 lbs. In 1837 the imports were 79,651 lbs.; and 67,476 lbs. were exported to the undermentioned countries:—Russia, 836 lbs.; Germany, 1289 lbs.; Holland, 2199 lbs.; Belgium, 116 lbs.; France, 243 lbs.; Portugal, 337 lbs.; Turkey, 234 lbs.; China, 58,874 lbs.; United States of America, 3180 lbs.; Egypt, 53 lbs.; and in trifling quantities to several other parts. The supply received from each country is liable to great fluctuations. In 1833 the quantity imported from France was 11,508 lbs., and from Italy, in the same year, 9452 lbs. In 1830 the supply from Turkey was 192,136 lbs.; in the following year 8184 lbs.; and again in 1834 it amounted only to 12,438 lbs., though the importation in the previous year had not exceeded 72,020 lbs. On the 5th January, 1832, the quantity of opium in bond in London, Liverpool, Bristol, and Hull, was 10,674 lbs.; and on the 5th January, 1833, 20,517 lbs. Up to 1828 the duty was 9s. per lb., but in that year it was reduced to 4s., by 9 Geo. IV., c. 76; and in 1836 to 1s., by 6 and 7 Wm. IV., c. 60. The price of Turkey opium in bond, in 1831, was from 17s. to 18s.; in 1838, 14s. to 14s. 6d.; and in November, 1839, the price had fallen to 10s. per lb. The low price in the latter case was in a great measure, occasioned by the then existing state of the opium trade in China; but it has since risen to 12s., and a Greek house in London holds a thousand chests at a still higher price.

Mr. Davis states ('The Chinese,' vol. ii.) that opium has always been prohibited in China; but this does not appear to have been the case. It was a legitimate branch of trade down to the close of the last century, prohibitory regulations having been first made in 1796. From this period the trade has always been contraband, and yet in little more than forty years the consumption of Indian opium in China has risen from 1000 to about 27,000 chests per annum. Opium has constituted about one-half of the total value of British imports at Canton and Lintin, and tea has formed something less than the same proportion of our exports, that is, the value of the opium sent to China has exceeded the value of the tea which we have taken from that country. This fact is shown in a table in Mr. Davis's work:—

Imports in 1833.		Exports in 1833.	
	Dollars.		Dollars.
Opium . . .	11,618,617	Tea . . .	9,133,749
Other imports	11,858,077	Other exports .	11,309,521
	23,476,244		20,443,270

Nothing but the extraordinary corruption of the Chinese authorities can account for this increase of a trade prohibited by the laws; but it is another proof of the difficulty of putting in force regulations which are at variance with the popular habits and taste.

Macao was at first the centre of the Indian opium trade, but in 1802, in consequence of the conduct of the Portuguese towards the British merchants, the trade was removed to the island of Lintin. Here the opium is kept stored in armed ships, and delivered to the Chinese by written orders from Canton, on the sale being concluded and the money paid at that place.

In 1832 the number of chests of opium imported into China was 23,670, of the total value of 15,338,160 dollars, or above 3,000,000*l*. The price had been falling for several years, and at the same time the quantity imported had increased. Mr. Davis, writing in 1836, expresses an opinion that this increase had rendered the Chinese rather more strict in the prevention of opium smuggling. The Chinese censor showed, in the memorial to the emperor already quoted, that the 'magistrates of districts issue proclamations interdicting the clandestine sale of opium, at the same time that their kindred and clerks and servants smoke it as before. Then the nefarious trader make a pretext of the interdict for raising the price. T

police, influenced by the people in the public offices, become the secret purchasers of opium, instead of labouring for its suppression; and thus all interdicts and regulations become vain.' In 1833 the emperor was induced to issue some fresh regulations for checking the introduction of opium, awarding punishments of various kinds to the different classes of offenders. 'Let the buyers and smokers of opium be punished with one hundred blows, and pilloried for two months. Then let them declare the seller's name; and, in default of this declaration, let the smoker be punished, as an accomplice of the seller, with a hundred blows and three years' imprisonment. Let mandarins and their dependents who buy and smoke opium be punished one degree more severely than others; and let governors and lieutenant-governors of provinces, as well as the magistrates of subordinate districts, be required to give security that there are no opium smokers in their respective departments. Let a joint memorial be sent in at the close of every year, representing the conduct of those officers who have connived at the practice.' From a communication in the 'Colonial Gazette,' No. 39, and also from a pamphlet published by an American merchant at Canton, it appears probable that the Chinese government is less alarmed about the introduction of opium, than at the drain of bullion which the opium trade occasions. Formerly the produce of China was paid for in silver, but opium has so successfully served the purpose as a medium of commercial exchange, that it has been less necessary to employ coin or bullion. The opium trade has thus been the means of draining China of the precious metals; and this process has been going on for the last twenty years, until their price has risen. The Chinese do not regard gold and silver as signs of wealth merely, but as wealth itself, and in many of their public documents relating to the opium trade the export of silver is also noticed; and in some cases it is difficult to ascertain which is considered the paramount grievance. In 1836 an officer of the Chinese government proposed that opium should be rendered a legitimate article of commerce, and that the cultivation of the poppy should be permitted. Extraordinary as it may appear, the poppy is cultivated in China through the connivance of the local functionaries, who are the most corrupt officials in the world. The cultivation is carried on in at least six different provinces in opposite extremities of the empire, and in one of these provinces the quantity of opium prepared annually amounts, it is said, to several thousand chests, that is, about as much as was imported into the whole of China forty years ago; and, adding the quantity prepared in the other five provinces, the growth of Chinese opium is already considerable; and it will be very powerfully stimulated by recent circumstances connected with the supply of the foreign article.

In March, 1839, the Chinese authorities appear to have taken active steps with a view of putting a stop to opium smuggling, by seizing a number of British merchants, and retaining them in custody until the stock of opium on hand belonging to all foreigners was delivered into their hands. On the recommendation of Captain Elliot, the superintendent of the British trade at Canton, 20,283 chests of opium, worth nearly 3,000,000*l.* sterling, were delivered to the Chinese authorities. The whole of the opium was subsequently destroyed by the Chinese, foreigners being invited to witness the operation. Three vats, 175 feet by 75, were prepared, and each chest being re-weighed and broken up in the presence of superior officers, the contents were thrown into the vats. The destruction was partly effected by salt and lime, and a large number of men were employed from day to day with long rakes in macerating the opium until it had become a fetid mud, when sluices were opened which communicated with the river, and the whole was washed away. The spot where this operation took place was well guarded, the workmen were ticketed, and the Chinese government, in the destruction of the drug at least, acted with perfect sincerity. About 300 chests per day were destroyed. The merchants then retired to Macao, but after a residence of three months they were expelled by the Chinese on the 27th of August, in consequence of Captain Elliot's refusal to give up for punishment a seaman (whose name could not be discovered) charged with killing a Chinese in a brawl. They retired on board the English merchantmen at Hong-Kong, but the fleet being in want of provisions, Captain Elliot, on the 4th of September, attempted to procure a supply from the natives, but was opposed by three Chinese war-junks, and a conflict ensued in which several Europeans were wounded

and some Chinese killed. A fresh attack, which was to have taken place at day-break on the 5th, was countermanded by Captain Elliot. This affair has complicated still more our commercial relations with the Chinese. The receipts which Captain Elliot gave to the British merchants, on behalf of the English government, promising indemnity for the sacrifice of their property, have been offered as 'opium scrip' in the markets of Calcutta, Madras, and Bombay, and have also been remitted to London for negotiation. Captain Elliot holds his appointment under the 3 & 4 William IV., c. 93, passed for 'regulating the trade to China and India.' This act provides for the establishment of a British authority in the dominions of the emperor of China, and invests the superintendent with many important powers relating to the trade. The decision of the English government in reference to this subject, whether it will honour Capt. Elliot's opium drafts or what steps it may order to be taken in China, are at this moment (January, 1840) unknown in England. A communication was sent in November, 1839, by the Foreign Office to the East India and China Association, in reply to an address from that body, from which it appears that the propriety and expediency of Captain Elliot's proceedings, so far as they were then known, were approved of by the government; but in a second communication, dated on the following day (November 28th, 1839), the secretary of state for foreign affairs declined notifying the intentions of the British government in reference to a blockade of the Chinese ports. In the Queen's speech on the opening of parliament, January 16, 1840, the state of the British interests in China was alluded to in the following terms:—'Events have happened in China which have occasioned an interruption of the commercial intercourse of my subjects with that country. I have given, and shall continue to give, the most serious attention to a matter so deeply affecting the interests of my subjects and the dignity of my crown.' In the meantime the government sales of opium at Calcutta are not discontinued, and 18,932 chests are advertised to take place in the agencies of Bahar and Benares, from January to June, 1840. The general belief is, that it will not be possible under any plan, however rigorous, to check the smuggling of opium into China.

#### I. An account of the quantity of Opium imported, exported, and cleared for consumption in the United Kingdom.

Cleared for Consumption.		Cleared for Consumption.	
Years.	lbs.	Years.	lbs.
1820 (duty 9 <i>s.</i> )	16,169	1830	22,668
1821	18,080	1831	25,937
1822	18,391	1832	30,258
1823	20,985	1833	35,407
1824	22,752	1834	28,467
1825	20,582	1835	31,247
1826	28,329	1836 (duty 1 <i>s.</i> )*	38,943
1827	17,322	1837	37,487
1828 (duty 4 <i>s.</i> )	20,680	1838	30,435
1829	23,970		

#### Average Annual Quantities at various periods, each year inclusive:—

	Imported.	Exported.	Home Consumption.
	lbs.	lbs.	lbs.
From 1796 to 1798 (Great Britain)	13,068	2,037	11,029
" 1793 to 1801 (ditto)	22,715	2,792	19,923
" 1820 to 1827 (United Kingdom)	71,714	40,848	30,866
" 1829 to 1834 (ditto)	81,852	56,868	24,984

#### II.—Consumption and Value of Indian Opium in China.

From April 1 to March 31.	Patna and Benares. Chests.	Malwa. Chests.	Total Chests.	Total Value. Dollars.
1816-17	2610	600	3210	3,637,000
1821-22	2910	1,718	4628	8,314,600
1826-7	3661	6,308	9,969	9,610,083
1827	5134	4,401	9,535	10,425,075
1828	5965	7,771	13,732	12,533,115
1829	7143	6,857	14,000	12,057,157
1830	6660	12,100	18,760	12,904,263
1831	5960	8,265	14,225	11,501,584
1832	8267	15,403	23,670	15,332,759

Average annual number of chests of Patna and Benares and Malwa, from 1816 to 1823, 4455; from 1824 to 1831, 11,953.

Average price per chest.—From 1816 to 1823, Patna and Benares, 1446 dollars; Malwa, 1073 dollars. From 1824 to 1831, Patna and Benares, 965 dollars; Malwa, 862 dollars.

Range of Prices from 1816 to 1832—Patna and Benares,

\* From August 13th.



highest price per chest, 2550 dollars, in 1822-3; lowest, in 1830-1, 790 dollars: Malwa, highest price, in 1820-1, 1800 dollars; lowest price, in 1830-1, 520 dollars.

**OPOPO'NAX CHIRO'NIUM** (Koch), a native of the south of Europe, and also of Asia Minor, a tall plant often eight feet high, from the base of the stem or summit of the root of which, when wounded, flows a yellow milky juice, which hardens on exposure to the sun and air. It occurs either in tears or in masses called placenta. The tears are globose or angular, fatty to the touch, externally brownish-yellow, fragile, and, on being triturated, yielding a yellow powder. The odour is strong, somewhat nauseous, resembling ammoniacum with a bitter balsamic taste. The specific gravity is 1.622.

Its constituents are resin, gum, and volatile oil. In its action on the human system it corresponds with the other gum-resins of the Umbellifera. [ASSAFETIDA.] The *Ferula Hooshee*, a native of Beloochistan, produces a gum called hooshee, which, though not collected, resembles the Opoponax of the European shops. (Royle, *Flora of the Himalaya*, p. 231.)

**OPORTO** (O PORTO, 'the Port'), the largest city in Portugal, Lisbon excepted, and a seaport in the province of Entre-Douro-e-Minho, is situated on the declivity of a hill in an elevated situation on the northern bank of the river Douro, and about three-fourths of a league, or two English miles, from its mouth, in 41° 11' N. lat., 8° 40' W. long., about 160 miles north of Lisbon. Seen from the river, the city presents a very striking and romantic appearance; the houses, being all white-washed, give it an air of excessive cleanliness, but, on a closer inspection, most of the streets, especially those on the declivity of the hill, are found to be narrow, crooked, and dirty. Oporto is, however, on the whole, considered to be the cleanest city in Portugal. It contains many broad straight streets, with a number of new and handsome houses, having gardens attached to them filled with vines and orange-trees. In one of the principal thoroughfares is situated the English factory-house, a large handsome building, erected about twenty years ago, in which the British consul has his office. It is a sort of club-house, designed to bring merchants and foreigners together, and contains a fine library, a reading-room, and a spacious ball-room. The steep declivity of the hill on which the town is built makes it a very laborious task to ride on horseback or in carriages, although this inconvenience has been somewhat remedied by recent improvements. On the east side of the town, houses are built against so steep a part of the declivity over the stream, that they can only be approached by steps cut out of the rock.

The river affords a tolerably secure harbour without any artificial aid except an elevated and walled quay, to which the ships' cables may be fastened during the floods, which often come down with such force, that, without this support, the vessels would inevitably be carried out into the sea. The mouth of the Douro is however obstructed by rocks and quicksands, which render its entrance difficult. This obstacle once surmounted, the river is well adapted to the purposes of trade, being very deep in front of the town. Two-masted vessels can come close to it, those with three masts within a quarter of a league, and the large Brazilian ships alone used to unload their cargoes in the road. The quay, which is of a simple construction, extends the whole length of the town.

Oporto was occasionally the residence of the ancient kings of Portugal, until Alfonso I., assisted by a fleet of English crusaders under the command of William Longsword, wrested Lisbon from the hands of the Almoravides, in October, 1147. During the middle ages Oporto was famous for the strength of its fortifications; it is now partly surrounded by an old wall five or six feet thick, flanked at intervals by strong towers. To the westward, along the declivity of the hill, is the market-town of Gaya, where, in ancient times, a place named *Cale*, mentioned by old writers, is said to have stood. Oporto being afterwards built, and being found more convenient for ships owing to the greater depth of the river, the former was abandoned by its inhabitants, who migrated to the latter. Hence the name of Oporto, or *Portus Cale*, that is, the harbour of Cale, whence *Portugal*, and at last Portugal, were derived. To the east lies the considerable and populous town of *Villanova do Porto*, chiefly inhabited by wine-coopers and other people employed by the merchants of Oporto; and between that town and Gaya, on a small plain along the bank of the

river, are the immense vaults, or lodges, as they are there called, where the wine is kept till it is stored. Between the village where these vaults are and Oporto there is a communication across the river by a bridge of boats, the expense of which is defrayed by each person paying a small copper coin as he passes and repasses. All communication is however suspended during a few weeks in the spring, when the river is so much swollen by the heavy rains and the melting of the snow on the mountains of Spain, that the water often rises to the height of twenty feet, as in 1820, when it did incalculable damage to the shipping then in the river. On a rocky eminence near Villanova is the celebrated convent and garden called Mosteiro da Serra, which once belonged to the religious order of Austinian monks. It was there, during the Peninsular War, that the British crossed the Douro under a tremendous fire from the batteries erected by the French on the north side, and it was from there also that in 1832 Don Pedro, aided by the British, repulsed the royalist troops commanded by the usurper Don Miguel.

Oporto contains four suburbs—Mazarelos, Cedofeita, Santo Ovidio, and La Lapa, which, together with the city, cover an extent of ground of about two miles. It has 11 public squares called *campos*, of which the most spacious are As Ortas, San Roque, and Vitoria; 14 hospitals, or charitable asylums; 90 churches, besides a fine and spacious cathedral rebuilt by Henry of Besançon, first count of Portugal, A.D. 1105; and 17 monasteries, now uninhabited, the religious orders having been, in Portugal as well as in Spain, suppressed since the establishment of the liberal system. It is the see of a bishop, who resides chiefly at Mezanfrio, but has a very fine modern-built palace within the city. A theatre, in the highest part of the town, built by an Italian architect named Mazzolleschi, is very much admired.

The principal trade of Oporto consists in wine, white or red, but chiefly the latter, which is made in the province of Tras-os-Montes, to the north-west, and in some districts of Entre-Douro-e-Minho, to the north. It is exported in large quantities to various parts of Europe and America, but the greatest consumption is that of this country, where it is known as 'Port wine.' The amount yearly exported varies from 50,000 to 70,000 pipes. There are other articles of export, such as oil, sumach, linen, lemons, and oranges, of which last fruit no less than nine millions were exported in 1789. The imports are woollen, cotton, iron, and hardware manufactures, mainly from England; salt-fish, hemp, and flax; wheat and rice from the United States. There are also at Oporto some manufactures of hats, silks, linen stuffs, and pottery, besides ropewalks and dockyards, none of which however are in a thriving condition.

The population of Oporto is stated by Murphy at 63,000 souls; but he no doubt forgot to include the two annexed towns of Villanova and Gaya, which in 1827 made it amount to eighty thousand. That number however must have diminished rather than increased by the loss of the Portuguese colonies, a death-blow to the commerce of Oporto, as well as by the ravages of war to which the town has been subjected since the beginning of the present century. It was first taken and sacked by the French during the Peninsular war. It became afterwards, in 1831-33, the scene of a fierce contest for the throne of Portugal, between Don Pedro, the ex-emperor of Brazil, and his brother Don Miguel, who had usurped the crown from his niece Doña Maria. During the siege, which lasted upwards of one year, the town of Oporto was partly destroyed by the artillery of the assailants, and several wealthy mercantile houses were entirely ruined by the complete stoppage of trade, and the wanton destruction of property by the troops of the usurper, who, on their retreat from before the lines of Oporto, blew up with gunpowder several wine-cellars belonging to the merchants of the city.

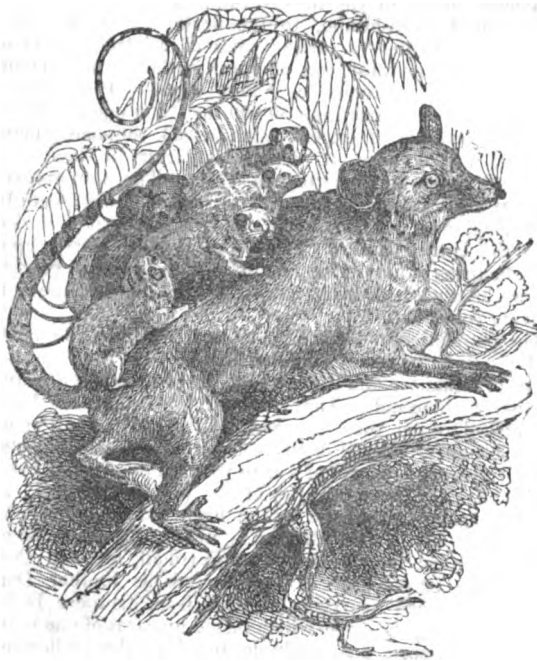
The climate of Oporto is damp and foggy in winter, in consequence of its mountainous situation; but although, owing to the above circumstance, the air is cooler than anywhere else in Portugal, it seldom freezes. In summer the heat is excessive, especially in the narrow valley formed by the hills on the southern declivity of which Oporto is situated. Most of the plants of the Cape of Good Hope grow in the open air, as well as gooseberries, currants, and other fruits of the colder countries of Europe. The soil, though well cultivated, is not fertile, and few of the productions which are annually exported by the Douro are grown within any short distance of the town. The dress of the inhabitants

somewhat differs from that of the southern provinces, and the peasants use wooden shoes. (Miñano; La Clède, *Histoire Générale de Portugal*, vol. ii.; Link's *Travels*.)

**OPOSSUM.** The term *Opossums* is generally used to designate the *Didelphidae*, now confined to the American continents. The former existence of this type in Europe in association with *Palaotherium*, *Anoplotherium*, and other extinct pachydermatous quadrupeds, is proved by the fossil remains in the Paris basin (Eocene of Lyell).

The dentition of these scansorial Marsupials bears more resemblance to that of the *Bandicoots* (*Perameles*) than to that of the *Dasyuri*, if the structure of the molar teeth be excepted.

The whole of this subfamily have the inner toe of the hind foot converted into a thumb, destitute however of a claw, and this development is apparent in nearly all the species which have a scaly prehensile tail. Professor Owen remarks that in some of the smaller *Opossums* the subabdominal tegumentary folds are rudimental, or merely serve to conceal the nipples, and are not developed into a pouch; and in these the young adhere to the mother by entwining their little prehensile tails around hers, and clinging to the fur of her back; whence the specific name *dorsigera*, applied to one of the species. He further observes that few facts would be more interesting in the history of the Marsupialia than the condition of the new-born young, and their degree and mode of uterine development in these Opossums. Since the Marsupial bones serve not, as is usually described, to support a pouch, but to aid in the function of the mammary glands and testes, they are, he adds, of course present in the skeleton of these small pouchless Opossums, as in the more typical Marsupials. (Professor Owen's interesting paper *On the Classification of the Marsupialia*, in *Zool. Trans.*, vol. ii., part iv.; and the article **MARSUPIALIA**.)



*Didelphus dorsigera*.

(From the specimen in the British Museum.)

**OPPELN** is one of the four governments of the Prussian province of Silesia, and comprises the greater part of what was formerly called Upper or Higher Silesia, from its almost wholly consisting of hills and mountains. It is bounded on the north-west by the government of Breslau, on the east by the kingdom of Poland and the republic of Cracow, on the south-east by Galicia, and on the south and south-west by Austrian Silesia. Its area is 5000 square miles, and it is divided into ten circles. It has extensive forests of fine timber, and abounds in valuable minerals. This part of the province is less fertile and much colder than Lower Silesia. The snow falls early and lies late, so that the inhabitants are obliged to use snow-shoes and sledges. The old Slavonic dialect, still in use in some parts of the province, is almost wholly confined to these mountains.

The Roman Catholic religion preponderates more than in any other part of Silesia. Of a population of 740,000, only a fifteenth part are Protestants.

There are some manufactures in the government; and a considerable export trade in the natural products of the country is carried on by means of the Oder, which traverses the country in its whole extent.

**OPPELN**, the capital of the government, is situated in 50° 36' N. lat. and in 17° 57' E. long. It is a walled town with four gates, and is situated on the Oder, in which there is an island called Pascheke, which is laid out like a park, and contains some dwelling-houses, a coffee-house, and a bathing-house. The island is connected with the left bank by the great bridge, and with the town by two bridges over an arm of the Oder. The public buildings are not remarkable. There are several churches, a synagogue, a gymnasium, a town-hall, some schools, a hospital, and other charitable institutions. The population, according to the latest census (to 1st January, 1839), is 6821. Besides tanneries and manufactories of earthenware, there are manufactures of linen, tape, and leather. The town has a good trade in timber, zinc, lead, calamine, hardware, leather, woollen cloths, and Hungary wines.

(Müller's *Handbuch*, 1836; Fischer's *Handbuch über Schlesien*, 1817; Haessel's *Handbuch*; *Preussische Staats-Zeitung*, 1839, which gives the latest official returns of the population.)

**OPPELNHEIM** is the capital of a district of 20 parishes, with 15,000 inhabitants, on a steep declivity on the left bank of the Rhine, in the grand-duchy of Hesse Darmstadt on the site of the Roman Bauconia. The inhabitants, 2400 in number, carry on a considerable trade by the Rhine. Oppenheim has one Roman Catholic and one Protestant church, four hospitals, and a Protestant consistory. The town was formerly a free imperial city, and a diet was held in it in 1076. It was a place of some celebrity in the Thirty Years' War, when it was almost destroyed by Gustavus Adolphus, and afterwards in 1689 by the French under Melac. The beautiful cathedral of St. Catherine, a monument of German architecture of the thirteenth century, and an imitation on a smaller scale of the cathedral of Cologne, still lies partly in ruins. The ruins of Landseronburg and the Swedish pillar are worthy of notice. In the vicinity of Oppenheim is the romantic Nierstein, called by the Romans Neri, famous for its wine; and in the celebrated Wonnegau (which may be translated the Vale of Delight) is the spa called Sironabad, which was known to the Romans, and has been again in use since 1802.

**OPPIAN** (Ὀππιανός), an eminent grammarian and poet of Cilicia (Hieronymus, in *Ezek.*, 47; Athen., *Deipn.*, lib. i., p. 13 b., ed. Casaub.), two of whose works are still extant under the titles 'Cynagetica' and 'Halieutica.' His father's name was Agesilaus, and his mother's Zenodora, but as to the time and place of his birth authorities are not quite agreed. Syncellus (*Chronogr.*, p. 352, 353) and Jerome (in *Chron.*) place him in the reign of Marcus Aurelius Antoninus; but Sozomen (*Præfat. ad Hist. Eccles.*), Suidas (in voce 'Ὀππιανός') and others state him to have lived in the time of Severus; and though Oppian in both his poems (*Halieut.*, lib. i., v. 3; and lib. iv., v. 5; *Cynaget.*, lib. i., v. 3) addresses the emperor by the name 'Antoninus,' it is probable that Caracalla is meant, as this appellation was conferred upon him when he was associated with his father in the empire, A.D. 198 (Herodian, lib. iii., cap. 10), and is the name by which he is commonly designated by the ancient historians, Herodian, Dion Cassius, &c. As to his birth-place, Suidas supposes it to have been Corycus, but the anonymous author of the Greek life of Oppian attributes most other authorities say that he was born at Anazarba, a city which also gave birth to Dioscorides. Stephanus Byzantinus (in voce 'Ἀναζαρβά') Indeed Oppian himself seems to refute the assertion of Suidas, for in the third book of the 'Halieutics,' v. 205, sq., he distinguishes his fellow-countrymen from their neighbours the Corycians. His father appears to have been a person of some consideration in his native city, for he was banished to the island of Melita in the Adriatic by Severus, for suffering himself to be so entirely engrossed by his philosophical studies as to neglect court in person along with his fellow-citizens to pay his respects to the emperor when, in taking a progress through Cilicia, he made his entrance into Anazarba. He was accompanied in his exile by his son Oppian, who had enjoyed the advantage of an excellent education under the superintendence

ther, and who now began to devote himself to poetry. ngly he composed his poem on fishing, and pre- either to the emperor Severus (Sozomen, *Præfat. Eccles.*), or more probably (Suidas, in voce 'Or- Oppian, *Halieut.*, i. 3; iv. 5) to his son Caracalla, so much pleased with it, that he not only repealed ance of his father's banishment, but also presented a piece of gold for each verse that it contained.\* of the plague shortly after his return to his native at the early age of thirty; leaving behind him three in Hawking (Ἰξευτικά), Hunting (Κυνηγετικά), and (Ἀλιευτικά).

'Ixeutics' consisted of two books according to Sui- ather of five, according to the anonymous Greek of Oppian's life, and are no longer extant, but a araphrase in Prose, by Eutecnius, of three books, ished, Havniae, 1702, 8vo., Gr. and Lat., ed. E. us, which is also inserted in Schneider's edition of Argent., 8vo., 1776.

'Cynegetics' are written in hexameter verse, con- about 2100 lines, and are divided into four they display a very fair knowledge of natural with which however a good many absurd fables d up. He says expressly that the tusks of the are not teeth but horns (lib. ii., v. 491, sq.), and mentions a report that these animals are able to *speak* (v. 540, sq.): he states that there is no such thing as a *female* rhinoceros, but that all these animals are of the *male* sex (v. 563); that the lioness when pregnant for the first time brings forth five whelps at a birth, the second time four, the next three, then two, and lastly only one (lib. iii., v. 58, sq.); that the bear brings forth her cubs half formed and licks them into shape (v. 159, sq.); that so great is the enmity between the wolf and the lamb, that even after death, if two drums be made of their hides, the wolf's hide will put to silence the lamb's (v. 282, sq.); that the hyænas annually change their sex (v. 288, sq.); that the boar's teeth contain fire inside them (v. 379, sq.); that the ichneumon leaps down the throat of the crocodile while lying asleep with its mouth wide open, and devours its vis- cera (v. 407, sq.). [ICHNEUMON.] He thinks it necessary to state expressly that it is *not* true that there are no *male* tigers (v. 357, sq.). He gives a very spirited description of the giraffe, 'the exactness of which,' says Mr. Holme ('Earlier Notices of the Giraffe,' in 'Trans. of the Ashmol. Soc.,' vol. ii.), 'is in some points remarkable; particularly in the observation that the so-called horns do not consist of horny substance (οὐτε κέρας κερύν); and in the allusion to the pencils of hair (δάκηχραι κεφαλαί) with which they are tipped.' He adds, 'That the animal must have been seen alive by Oppian is evident from his remark on the brilliancy of the eyes, and the halting motion of the hinder limbs.'

The 'Halieutics' are also written in hexameter verse, and consist of five books, of which the two first contain the natural history of fishes, and the three last the art of fishing. In this poem, as in the 'Cynegetics,' the author displays considerable zoological knowledge, though it contains several fables and absurdities,—more perhaps than we meet with in Aristotle, but certainly not so many as in Pliny and Ælian. He mentions (lib. i., v. 217, sq.) the story of the Remora, or sucker (ἰχθυήνη), being able to stop a ship when under full sail by sticking to the keel, and reproves the incredulity of those who doubt its truth (*Plut. Sympos.*, lib. ii., Quæst. 7); he was aware of the peculiarity of the Cancellus, or hermit-crab (καρκινάς), which is provided with no shell of its own, but seizes upon the first empty one it can find (v. 320, sq.); he gives a beautiful and correct description of the Nautilus (v. 338, sq.); he says that the Muræna, or lamprey, copulates with land serpents, which for the time lay aside their venom (v. 554, sq.); he notices the numbness caused by the touch of the Torpedo (σάπρη) (lib. ii., v. 56, sq.; and lib. iii., v. 149, sq.); and the black fluid emitted by the Sepia or cuttle-fish, by means of which it escapes its pursuers (lib. iii., v. 156, sq.); he says that a fish called Sargus

(σαργός) copulates with goats, and that it is caught by the fisherman's dressing himself up in a goat's skin, and so enticing it on shore (lib. iv., v. 308, sq.); he several times mentions the dolphin, calls it, for its swiftness and beauty, the king among fishes (as the eagle among birds, the lion among beasts, and the serpent among reptiles) (lib. ii., v. 533, sq.), and relates an anecdote, somewhat similar to those mentioned by Pliny (*Hist. Nat.*, lib. ix., cap. 8), and which he says happened about his own time, of a dolphin that was so fond of a little boy that it used to come whenever he called it by its name, and suffered him to ride upon its back, and at last was supposed to have pined away with grief on account of his death (lib. v., v. 448, sq.).

The 'Halieutics' are much superior to the 'Cynegetics' in point of style and poetical embellishment, and it is partly on account of this great disparity that it has been supposed that the two poems were not composed by the same person. But there are other and stronger reasons in support of this opinion (which was first put forth by Schneider in the preface to his first edition of Oppian's works), rendering it almost certain that, though by the universal consent of antiquity Oppian wrote a poem on hunting, yet it cannot be that which now goes under his name. Oppian was (as we have seen) a Cilician, but the author of the 'Cynegetics' tells us distinctly, in two different passages, that his native place was a city on the Orontes in Syria (probably Apamea), (lib. ii., v. 125-127, and *ibid.*, v. 156, 157). This has been denied by Belin de Ballu, who published an edition of the 'Cynegetics,' Argentor., 1786, 4to. and 8vo., Gr. and Lat., and who (as Dibdin says) 'seems to have entered upon the task almost expressly with a determination to oppose the authority and controvert the positions of Schneider;' but it is only by altering the text in both passages (and that too not very skilfully) that he has been able to reconcile them with the commonly received opinion that the poem is the work of Oppian. In Schneider's second edition he continues to hold the same opinion, and replies to the objections of Belin de Ballu. It appears, from an allusion to fishing and the sea deities, in the first book of the 'Cynegetics' (v. 77-80), that this poem was composed after the 'Halieutics,' and as a sort of supplement or companion to it; and this has tended to confirm the common opinion that both poems were written by the same author.

With regard to the poetical merits of Oppian, he seems to be one of those poets whose works have been more praised than read. Julius Cæsar Scaliger pronounces him 'to be a sublime and incomparable poet, the most perfect writer among the Greeks, and the only one of them that ever came up to Virgil.' (*Poet.*, lib. v., cap. 9.) Sir Thomas Browne calls him 'one of the best epic poets,' and 'wonders that his elegant lines should be so much neglected' (*Vulgar Errors*, book i., chap. viii.); and, if, as Rapin says, he is sometimes *dry* (*Réflex. sur la Poétique*, p. 176), it may fairly be accounted for and excused when we consider the unpropitious nature of his subject. His style is florid and copious, the language upon the whole very good, though (as was noticed by Dan. Heinsius, *Ad Nonni Dionysiaca*, p. 19), it is now and then deformed by Latinisms.

The first edition of the 'Halieutics' was published Florent., 1515, 8vo., Gr., ap. Ph. Juntam. A Latin translation in hexameter verse, by Laurentius Lippius, was published 1478, 4to. They were translated into English verse by Diaper and Jones, Oxford, 8vo., 1722; into French by Limes, Paris, 8vo., 1817; and into Italian by Salvini, Firenze, 8vo., 1728. The 'Cynegetics' were first published (together with the 'Halieutics') Venet., in Ædib. Aldi, 8vo., 1517. They were translated into Latin verse by Bodin, Paris, 4to., 1555; into English by Mawer, Lond., 8vo., 1736 (containing the first book only); into French by Florent Chrestien, Paris, 4to., 1575, and by Belin de Ballu, Strasb., 8vo., 1787; into German by Lieberkühn, Leipz., 8vo., 1755; and into Italian, with the 'Halieutics' noticed above, by Salvini. Fabricius states (*Biblioth. Gr.*), on the authority of Lambecius, that a paraphrase both of the 'Cynegetica' and of the 'Halieutica,' in Greek prose by Eutecnius, still exists in MS. in the library at Vienna. The last and (as far as it goes) the best edition of Oppian's two poems is Schneider's second edition, which unhappily is unfinished, 8vo., Lips., 1813, Græcæ, with a Latin verse translation of the 'Cynegetics,' by Pfeifer, published for the first time though executed in 1555. The most complete edition is that published by Schneider, Argentor., 1776, Gr. and Lat., 8vo., containing also the paraphrase of the 'Ixeutics,' by Eutecnius, men-

\* Suidas says 'twenty thousand,' but he must have counted the verses contained in all Oppian's poems, as the 'Halieutics' consist of only about 3500; for which, if we reckon the *argures* to be equal to twenty-five denarii, and worth (according to Hussey, 'Antient Weights and Money, &c.') 15s. 7½d., he must have received about 2734l. 7s. 6d. If (according to the common computation) we take the *argures* to be worth 16s. 1½d., it would amount to 2825l. 10s. 5d. In either case they might well be called χρυσᾶ ἔπη, 'golden verses!' Sozom., *loc. cit.*

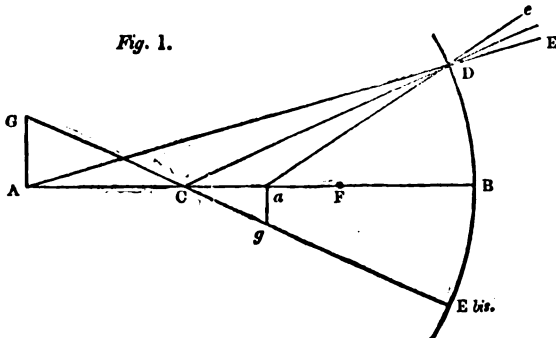


tioned above. Schneider published some addenda to this addition in his *Analecta Critica*, 8vo., Francof., 1777; Fascic. i., p. 31, sq.

#### OPPOSITION. [CONJUNCTION AND OPPOSITION.]

OPTICS is that branch of physical science which explains the formation of images, as depending on the known laws by which the modifications of light are governed. [LIGHT.] These images are formed either by polished reflecting surfaces or by transparent refracting media. In the former case the angles of incidence and reflection are equal; in the latter the sines of the angles of incidence and refraction are in a constant ratio for one and the same medium. The position and magnitude of the image of an object is easily ascertained, when we have previously ascertained the position of the image of a point, in reference to the position of the point itself and of the reflecting or refracting instrument; in other words, when we have found the relation between the conjugate foci, so called because it universally holds in optics, that whichever focus be considered the object, the other will be the image. The principal focus of an instrument is that to or from which a pencil of parallel rays falling perpendicularly (or nearly so) on the instrument is made to converge or diverge after reflexion or refraction. In a plane mirror the conjugate foci are similarly situated at opposite sides of the mirror [LIGHT]; consequently in this instance the instrument has no principal focus. Generally the distance of the principal focus from the instrument is called the focal length of that instrument, whether a reflector or a refractor. Since conjugate foci are mutually such, it follows that rays proceeding from the principal focus will, after reflexion or refraction, emerge in a parallel pencil. We shall now proceed to the relations existing between the conjugate foci of spherical reflectors, observing that the axis of the instrument is the right line containing the centre of the spherical surface and the conjugate foci. The rays under consideration are those which are directed nearly along the axis, and which therefore fall exceedingly nearly perpendicularly on the reflector.

Fig. 1.



Let DBE represent the section of a spherical reflector made by a plane passing through its axis, C its centre, A the focus of incident rays, AD an incident ray, ADC is the angle of incidence; make the angle ADC=ADC, then ADC is the angle of reflection, and if the point of incidence D were infinitely near to the point B in the axis, then all the reflected rays of which the incidence was nearly perpendicular would converge to a, the latter would then be the focus conjugate to A, for if rays diverged from a they would after reflexion evidently converge to A.

Now if a straight line as CD bisect an angle of a triangle, as the angle ADa, it will divide the base into segments AC, Ca proportional to the adjacent sides AD, Da (Euc., book vi.), that is, AC : Ca :: AD : Da, but when D is infinitely near to B we may write AB and Ba instead of AD and Da, in which case we should have AC : Ca :: AB : Ba. Let AB = Δ, aB = Δ', and the radius CB = r; then AC = Δ - r; Ca = r - Δ'; whence Δ - r : r - Δ' :: Δ : Δ', or Δ' (Δ - r) = Δ (r - Δ'); therefore 2ΔΔ' = r (Δ + Δ'), which may be also written in the form  $\frac{1}{\Delta} + \frac{1}{\Delta'} = \frac{2}{r}$ . We should have precisely

the same investigation if we had supposed rays as ED to fall on the convex side converging to a focus A; but being reflected in the direction De, they would appear to diverge from the conjugate focus a: hence the above formula applies to two cases, viz. when diverging rays fall on the concave surface, or converging rays on the convex surface, of a spherical reflector.

Example 1.—A candle is placed before a concave speculum at a distance of 3 feet from it: what will be the distance of its image from the same, the radius of the speculum being 2 feet?

Here, we have given Δ=3 feet, r=2 feet, and to find Δ' we substitute these numbers in the general formula  $\frac{1}{\Delta} + \frac{1}{\Delta'} = \frac{2}{r}$  which thus becomes  $\frac{1}{3} + \frac{1}{\Delta'} = \frac{2}{2} = 1$ ; whence  $\frac{1}{\Delta'} = \frac{2}{3}$  and therefore Δ' =  $\frac{3}{2} = 1\frac{1}{2}$  foot; the image will consequently be 1 foot 6 inches in front of the speculum.

It being sometimes convenient to measure the distances of the foci from the centre instead of the surface of the speculum, it is easy to find a proper formula from the proportion we have established, viz. AC : Ca :: AB : Ba. Let AC = ρ, Ca = ρ'; then AB = r + ρ, aB = r - ρ', whence ρ : ρ' :: r + ρ : r - ρ', or ρ (r - ρ') = ρ' (r + ρ) [therefore r (ρ - ρ') = 2ρρ'] consequently  $\frac{1}{\rho'} - \frac{1}{\rho} = \frac{2}{r}$ ; thus in the example given above we find (since ρ=1 and r=2)  $\frac{1}{\rho'} - 1 = 1$ , or  $\frac{1}{\rho'} = 2$ ; therefore ρ' =  $\frac{1}{2}$ , which is agreeable with the former result.

When the incident rays proceed from a point exceedingly distant (as the sun, for instance) then Δ being very great will be exceedingly small and may be rejected, in which case we have  $\frac{1}{\Delta'} = \frac{2}{r}$  or Δ' =  $\frac{r}{2}$ , that is, parallel incident rays are made after reflexion to converge to F, the middle point of the radius CB. Hence the focal length of a spherical speculum is one half that of its radius.

In examining the formula for the positions of the conjugate foci, viz.  $\frac{1}{\Delta} + \frac{1}{\Delta'} = \frac{2}{r}$  we find that when Δ=r we also must have Δ'=r; hence when the focus A is at C the centre, the conjugate focus a will be at the same point. If A moves to the left of C (in the fig.) Δ being then greater than r,  $\frac{1}{\Delta}$  is less than  $\frac{1}{r}$  and therefore  $\frac{1}{\Delta'}$  must be greater than  $\frac{1}{r}$  or Δ' is less than r, and as Δ increases to greater magnitudes, Δ' accordingly diminishes, until Δ becomes infinite, when Δ' as we have seen becomes  $\frac{r}{2}$ ; hence whilst A moves on the left indefinitely from C, the other focus moves on the right from C as far as the principal focus F.

With respect to the images formed by concave specula, let AG represent a small object at A; join GC, then GCI will be the axis of the speculum when G is considered the focus of incident rays, and its conjugate focus g can be found by the preceding formula; hence ag will be the image if AG, its position is evidently inverted, and by similar triangles, the linear dimensions of the image ag are to those of the object AG as Cg : CG or as ρ' : ρ. Now the formula  $\frac{1}{\rho'} - \frac{1}{\rho} = \frac{2}{r}$  gives  $\frac{\rho'}{\rho} = \frac{r}{2\rho + r}$ ; hence the image (in respect to linear dimensions) is less than the object in the ratio of r : 2ρ + r (or since ρ = Δ - r) as r : 2Δ - r; on the contrary, if the object be placed between the centre and principal focus, as at ag, then AG would become the image; for AG : ag :: ρ : ρ'; but  $\frac{\rho}{\rho'} = \frac{r}{r - 2\rho} = \frac{r}{2\Delta' - r}$ ; therefore AG

ag :: r : 2Δ' - r; which shows that the image is then greater than the object, or magnified. From the principles of geometry it follows that the surfaces of the image and object are as the squares of the linear dimensions, and the apparent volume, or bulk, as their cubes.

Example 2.—An object is placed at a distance of 12 feet in the axis of a concave speculum of two feet radius: to find how much it will appear diminished in its image, with respect to its linear, superficial, and solid dimensions.

Here r=2, Δ=12, 2Δ-r=22; therefore

for linear dimensions Image : Object :: 2 : 22,

that is :: 1 : 11;

for superficial do. the ratio is as 1 : 121, and for apparent bulk it is as 1 : 1331.

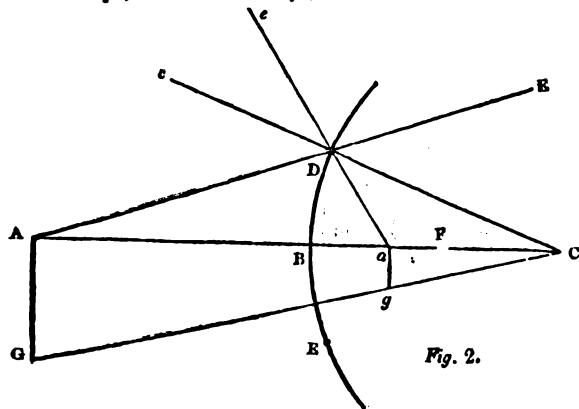
Heat being capable of reflection, like light, the rays of the

sun may be collected by a concave speculum in its principal focus (or burning-point) F.

**Example 3.**—To find how much an object will be magnified by the same speculum, when placed 1 foot 6 inches in front of it.

Here  $\Delta' = 1\frac{1}{2}$ ,  $r = 2$ ,  $2\Delta' - r = 1$ ; therefore in linear dimensions the ratio is as 2 : 1;  
in superficial as 4 : 1;  
and in cubical as 8 : 1.

Let us next consider the relation between the conjugate foci when diverging rays fall on a convex spherical speculum, which will also be the relation when converging rays fall on a concave speculum as will be evident by inspection of the figure (fig. 2). Employing the same letters with the diagram as before, C will be the centre, A the focus of incident rays,  $a$  of reflected rays, &c.



Let AD be an incident ray near the axis AC, join CD and produce to  $c$ ; make the angle of reflexion  $cDe$  equal to the angle of incidence  $ADc$ , and produce the reflected ray  $De$  to meet the axis in  $a$ ; then when D is infinitely near B,  $a$  is the focus conjugate to A. The same figure would equally apply if we had supposed rays ED converging to A to fall on the concave surface, for since the angles  $ADe$ ,  $cDe$ ,  $aDC$ ,  $CDE$  are all equal,  $Da$  would then be the actual reflected ray and therefore  $a$  would be yet the focus conjugate to A. Now since the external angle  $aDE$  of the triangle  $ADa$  is bisected by the straight line DC, it follows (Simson's *Euc.*, book 6) that  $AC : Ca :: AD : Da$  (and D being supposed infinitely near to B in order that the rays may be incident nearly perpendicularly)  $AB : Ba$ . Let  $AB = \Delta$ ,  $aB = \Delta'$ ,  $CB = r$ ,  $CA = \rho$ ,  $Ca = \rho'$ , then we have  
 $\rho : \rho' :: \Delta : \Delta'$ , or  $r + \Delta : r - \Delta :: \Delta : \Delta'$ , hence  
 $\Delta'(r + \Delta) = \Delta(r - \Delta')$ ,

therefore  $2\Delta\Delta' = r(\Delta - \Delta')$  whence  $\frac{1}{\Delta'} - \frac{1}{\Delta} = \frac{2}{r}$ . Again

the same proportion  $\rho : \rho' :: \Delta : \Delta'$  may be written  $\rho : \rho' :: \rho - r : r - \rho'$ ; hence  $\rho(r - \rho') = \rho'(r - \rho)$  therefore  $\rho(r + \rho') = 2\rho\rho'$  whence  $\frac{1}{\rho} + \frac{1}{\rho'} = \frac{2}{r}$ .

If we suppose  $\rho = r$ , we find  $\rho' = r$ , which shows that the foci are together at B, and as  $\rho$  increases,  $\rho'$  diminishes, until  $\rho$  becomes infinite, when  $\rho' = \frac{r}{2}$ , showing that  $a$  will then

reach the principal focus F. Hence, in general, the principal foci move in contrary directions, and meet both at the centre and circumference. In the formula just given one of the conjugate foci lies between the principal focus and the surface of the speculum; while in the first set, one lay between that point (F) and the centre.

With respect to images, if AG be the object and  $g$  the focus conjugate to G, then  $ag$  will be the image of AG; and conversely, if  $ag$  be the object, AG will be the image, and their proportion may be easily calculated, for  $AG : ag :: CA : Ca$ , that is, as  $\rho : \rho'$ , or as  $\Delta : \Delta'$ , which we have seen is the same ratio.

**Example 4.**—In the concave speculum of two-foot radius, an object is placed within 6 inches of its interior surface: how far will the image appear at the back of the speculum and how much will it seem enlarged?

Here  $r = 2$  foot,  $\Delta' = \frac{1}{2}$  foot, and since  $\frac{1}{\Delta'} - \frac{1}{\Delta} = \frac{2}{r}$  we have  $2 - \frac{1}{\Delta} = 1$ , therefore  $\Delta = 1$ , or the image will appear a

foot behind the convex side and will be enlarged in linear dimensions as  $\Delta$  to  $\Delta'$ , that is, as 2 to 1; in surface 4 : 1; in volume 8 to 1.

**Example 5.**—An object is placed 10 feet distance from a convex speculum of 3 feet radius; find the position and magnitude of its image.

Here  $r = 3$ ,  $\Delta = 10$ , therefore  $\frac{1}{\Delta'} - \frac{1}{10} = \frac{2}{3}$ , whence  $\frac{1}{\Delta'} = \frac{23}{30}$ , therefore  $\Delta' = 1\frac{7}{23}$  feet, or 1 foot 3 inches, 8 parts nearly, at which distance in the concavity of the speculum the image will seem to be, and (in linear dimensions) Object.

Image ::  $\Delta : \Delta' :: 10 : \frac{30}{23}$ , that is as 23 : 3; the surfaces as

529 : 9, &c. Thus the reader with only a moderate knowledge of simple equations will be able to solve all questions relative to the images of objects formed by spherical specula, concave or convex. The images in the last two examples are erect. Generally the image will be erect or inverted according as one of the conjugate foci is between the principal focus and surface, or between that point and the centre; for it is easily seen that in every case one of the foci is in some part of the radius between the centre and surface.

In the preceding calculations, we have confined ourselves to such rays as fall nearly perpendicularly on the reflecting surfaces. The rays which are at a considerable distance from the axis of a spherical speculum are not reflected accurately to the same point as those incident near the axis; hence arises a diffusion of the reflected rays arising from the sphericity of the speculum and denominated the *spherical aberration*; and when measured along the axis, it is called the *longitudinal aberration*; but when perpendicular to it, through the focus, the *lateral aberration*. It will be sufficient in this article to calculate their amount in the most usual case when the incident rays are parallel, as those which proceed from the heavenly bodies.

Let SD represent a ray falling parallel to the axis CB;

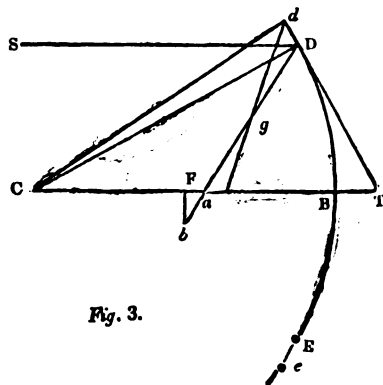


Fig. 3.

BD being the intermediate arc of the section of the speculum,  $Da$  the reflected ray; if this figure revolve round CB, it is evident that all rays incident on the annulus through which D moves will likewise be reflected to  $a$ , which is therefore strictly the focus of that annulus. Now F, the middle point of CB, is the point to which rays falling near the axis are reflected; hence  $aF$  is the longitudinal and  $Fb$  the lateral aberration corresponding to the above annulus. To calculate the amount of these we may observe that the angle  $SDC$  (of incidence) is equal to  $CDa$  (of reflexion), and also to  $DCa$  (by the theory of parallels); and since the angles  $aDC$ ,  $aCD$ , are thus equal, therefore  $Ca = aD$ . Let  $DT$  be a tangent at D, then  $aDT$  and  $aTD$ , being respectively the complements of  $aDC$  and  $aCD$ , are also equal, whence  $aT = aD$ , but also  $Ca = aD$ , therefore  $a$  is the middle point of  $CT$ ; and since F is the middle of CB, it follows that  $aF$  is the half of  $BT$ ; thus the longitudinal aberration is known; and since the angle  $Fab$  is the double of  $DCB$ , the lateral aberration is from thence known. Let the angle  $DCB = \theta$ , and radius  $CB = r$ , then  $CT = r \sec. \theta$  and  $BT = r (\sec. \theta - 1)$ , hence we obtain the exact values of the two aberrations, viz. the longitudinal  $= \frac{r}{2} (\sec. \theta - 1)$ , and the lateral  $Fb = \frac{r \tan. \theta}{2} (\sec. \theta - 1)$ . Hence in order that the aberrations may be inconsiderable, we ought to have the extreme magnitude



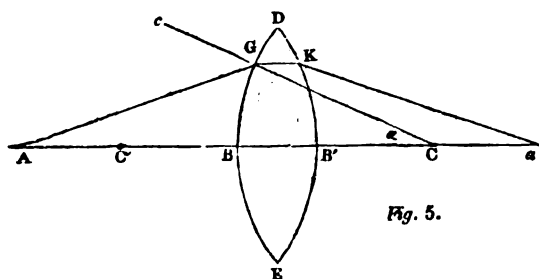


Fig. 5.

which CK cuts the axis from B; then the above equation is the same as  $\sin(\theta + \alpha) = m \sin(\phi + \alpha)$ , from which, by trigonometry we deduce  $\frac{\sin \theta - m \sin \phi}{\sin \alpha} = \frac{m \cos \phi - \cos \alpha}{\cos \alpha}$ .

Now  $\frac{\sin \theta}{\sin \alpha} = \frac{CG}{AG}$ , of which the ultimate value, when G is at B, is  $\frac{CB}{AB} = \frac{r}{\Delta}$ , for the same reason the ultimate value of  $\frac{\sin \phi}{\sin \alpha}$  is  $\frac{r}{\delta}$ , and the ultimate values of  $\cos \theta$ ,  $\cos \phi$ , and  $\cos \alpha$

are each unity; therefore we get  $\frac{r}{\Delta} - \frac{mr}{\delta} = m - 1$ , or  $\frac{1}{\Delta} - \frac{m}{\delta} = \frac{m-1}{r}$ ; hence  $\delta$ , which determines the focus of the first set of refracted rays, is known; and therefore also  $\delta + t$ , which is its distance from the second surface. Now, since the ray would traverse the same course if we supposed it to commence at  $a$ , and proceed through aKG to A, it follows in the same way that  $\frac{1}{\Delta'} + \frac{m}{\delta + t} = \frac{m-1}{r'}$ , from whence  $\Delta'$  is known.

If we neglect  $t$  as being small, we may eliminate  $\frac{m}{\delta}$ , and thence obtain  $\frac{1}{\Delta'} + \frac{1}{\Delta} = (m-1) \left( \frac{1}{r'} + \frac{1}{r} \right)$ ; the spherical aberrations may be found by a similar process to that we have employed for reflexion, and the inverse or erect positions of the images ascertained by the like method.

When we have one side plane, we have only to suppose  $r$  infinite, and thus one general formula, by proper attention to the signs, may be made to apply to all forms of lenses.

There is a cause of aberration for refracted light, which does not exist for reflected rays, and it is of more consequence in deforming and colouring images than all the effects of spherical aberration. The chromatic dispersion [DISPERSION] arises from the fact that all the coloured rays which compose solar or other light have different refractive indices for one and the same refracting medium; hence the prismatic spectrum, which only consists of successive circular images of the sun, of the different colours of the rays, overlapping each other. This aberration has, by the successive labours of Dollond, Fraunhofer, and others, been successfully combated. [OPTICS, PRACTICAL.]

**OPTICS, PRACTICAL**, is that part of science which applies the physical properties of LIGHT and the mathematical laws of OPTICS to the construction of useful optical instruments. By the former we determine the constants necessary to render the formulæ of the latter convertible into numbers. The refractive and dispersive indices peculiar to transparent media are constants of this nature, and the instruments adapted to the easy vision of near or distant objects, to great or small objects, and to other optical purposes, are, according to the plan of this work, described under their proper heads. [CAMERA LUCIDA; EYE; HELIOSTAT; MICROSCOPE; TELESCOPE; &c.]

The refractive indices of transparent and semi-transparent media have been a subject of research to many experimenters, and were considerably advanced by Newton. (Newton's *Optics*.) The additional properties of light discovered since his time have enabled philosophers to calculate to a far greater degree of accuracy the indices both of refraction and dispersion than was then practicable.

The theory of achromatism, or the method of correcting the aberrations of the rays of light, has been pursued by Euler, D'Alembert, Herschel (Sir J.), and many others; but the earliest successful construction was made by Mr. Hall in 1733. The same was effected in 1767 by Dollond,

whose labours, together with that of his son, gave a great impulse towards the complete accomplishment of an object of which Newton seems almost to have despaired. In the same career of late years we must distinguish Fraunhofer, of Benediktbeuern, in Bavaria, who obtained at an early age from the French Academy the prize for the actual construction of achromatic glasses. Not only were the necessary manual operations conducted by himself with patience and the minutest attention to all the practical details of the quality of his glasses and the accuracy of grinding and polishing, but he had also the merit and advantage of observing the dark lines which cross the prismatic spectrum, and which are of the greatest utility in determining the indices above alluded to. From the liability to oxidation of some of the ingredients in the composition, some of his finest telescopes have of late become considerably tarnished, particularly those in exposed situations. This could not have been easily foreseen, and many of his telescopes remain still in good condition.

The first account of his remarkable optical discoveries is given in a paper which he published in the 'Memoirs of the Academy of Bavaria' for 1814-15. By means of a theodolite furnished with a telescope, he measured the distances of the principal lines; and by applying a photometer to the different coloured rays, he has drawn a curve, the ordinates of which express the illuminating powers of the several rays. To these researches he soon afterwards added some beautiful experiments on the diffraction of light, an account of which he published at Munich, and they also appeared in an abridged form in the 'Bibliothèque Universelle,' January, 1822. It is believed that his close application to those and similar researches accelerated his death, which followed soon after.

The accurate determination of the refractive and dispersive indices has also been pursued with great success in this country, and simultaneously by some of the following distinguished men:—Dr. Thomas Young, Dr. Brewster, Dr. Wallaston, Sir J. Herschel, Prof. Faraday, &c.; and in France, by Biot, Dulong, &c., the results of whose experiments, in a very compressed form, are given in the two following tables:—

#### Refractive Indices.

Hydrogen . . . . .	1.00014	Glass—English plate . . . . .	1.500
Oxygen . . . . .	1.00027	Dutch . . . . .	1.514
Air (atmospheric) . . . . .	1.00029	Fraunhofer's crown (No. 13) ray E . . . . .	1.533
Nitrogen . . . . .	1.0093	Rock crystal . . . . .	1.568 to 1.575
Aqueous humour of eye . . . . .	1.337	Amber . . . . .	1.547
Vitreous . . . . .	1.336	Ruby red glass . . . . .	1.601
Salt-water . . . . .	1.343	Sulphur . . . . .	1.956
Albumen . . . . .	1.360	Glass of antimony . . . . .	2.000
Crystalline lens of eye . . . . .	1.378	Diamond (S.G. $\approx 3.4$ ) . . . . .	2.439
Oil of almonds . . . . .	1.470		
Oil of turpentine . . . . .	1.475		
Camphor . . . . .	1.500		

#### Dispersive Powers.

Chrom. lead . . . . .	0.400	Oil of turpentine . . . . .	0.043
Oil of cassia . . . . .	0.139	Amber . . . . .	0.041
Green glass . . . . .	0.061	Gum Arabic . . . . .	0.036
Flint glass . . . . .	0.052	Oil of cloves . . . . .	0.062
		Sulphate of lead . . . . .	0.060

**OPUNTIA** is the name given by botanists to those cactaceous plants which gardeners call *Indian Figs*, and which are so remarkable for their stems consisting of flat joints, broader at the upper than the lower end, but which eventually lose that appearance, becoming both cylindrical and continuous. On one of them, *Opuntia cochenillifera*, the cochineal insect is fed, and others yield a pleasant subacid fruit, which is eaten in hot countries. The lavas of *Etna* are in some places covered with the spiny bushes of *Opuntia vulgaris*, whose large purple juicy fruits are carried for sale to the neighbouring markets. It is however only a naturalised plant, its native country being South America within the tropics.

**ORA** (from the Saxon *ore*, metal), a money of account among the Anglo-Saxons, whatever it might have been in other parts of Europe. In the Domesday Survey, and, as Dr. Hickes assures us, in his 'Dissertation Epistolaris,' in ancient contracts of buying and selling, it is used for the ounce, or a twelfth part of the nummular pound.

There appear to have been two sorts of ora in use in the Saxon times, one of sixteen pence to the ora, the other of twenty pence. The ora of Domesday Book is perpetually valued at twenty pence: as in tom. i., fol. 2 b.: 'Cxi. solid. de denariis xx. in Ora.' Ibid., fol. 11 b.: 'Cxxv. lib. et x. solid. de xx. in Ora.' Tom. i., fol. 164: 'Modo redd. xxiij.

lib. candidorum nummorum de xx. in Ora.' The ora of sixteen pence was of earlier date; but its existence is recognised as late as in the Placita of the 37 Hen. III., Rot. 4. In the Laws of Canute, art. 31, 'De ponderibus,' it is said 'xv. Oræ libram faciunt.' (Clarke, *Connection of the Roman, Saxon, and English Coins*, 4to., Lond., 1771, p. 316; Hickeys's *Thesaurus, Diss. Epist.*, pp. 111, 112; Ellis's *General Introduction to Domest. Book*, vol. i., pp. 165, 166.)

ORACLE (from the Latin *oraculum*, and that from *os, or-is*, a mouth). Oracle was the Roman name used to denote the place where answers were supposed to be given by any of the divinities to those who consulted them respecting the future. Sometimes also it was used to signify the response which was delivered, and sometimes the deity from whom this response was imagined to proceed. Its primary and proper signification indeed is that of a response. Cicero (*Topic.*, 20) says that oracula were so called, 'quod inest in his *Deorum Oratio*.' Those who were sent to consult them were sometimes called *oratores*. (Livy, v. 15.) Oracular responses were called *chresmi* (*χρησμοί*) or *manteia* (*μαντεία*) by the Greeks; the name *manteion* (*μαντείον*) was also often given to the oracular place, or the seat of the oracle.

Curiosity regarding futurity, and the desire to penetrate its mysteries, are dispositions which exert a powerful control over the minds of men in every stage of society; among nations that have made little advancement in civilization and intelligence, they operate with peculiar force; and in these dispositions, combined with the belief that the gods had both the ability and the inclination to afford the knowledge so eagerly longed after, the oracles of the pagan world had their origin. Of these oracles the most famous were those of Greece, and among them that which had claims to the highest antiquity was the oracle of Jupiter at Dodona. According to the account of the priests of Dodona, it was established in the following manner. (Herod., ii. 55.) Two black doves took their flight from Thebes in Egypt. One flew to the temple of Jupiter Ammon in the Libyan desert; the other to Dodona, where, in human language, it proclaimed to the inhabitants of the district that they must establish an oracle (*μαντήριον*) of Jupiter there. The account of the priests of Thebes was somewhat different. (Herod., ii. 54.) But the most celebrated of the Grecian oracles was that of Apollo, at Delphi, a city built on the slopes of Parnassus in Phocis. It had been observed at a very early period that the goats feeding on Parnassus were thrown into convulsions when they approached a certain long deep cleft in the side of the mountain. This was the result of a peculiar vapour rising out of the cavern, and one of the goatherds was induced to try its effects upon himself. Inhaling the intoxicating air, he was affected in the same manner as the cattle had been, and the inhabitants of the surrounding country, unable to explain the circumstance, imputed the convulsive ravings to which he gave utterance, while under the power of the noxious exhalations, to a divine inspiration. The fact was speedily circulated widely, and a temple was erected on the spot. The honour of the prophetic influence was at first variously attributed to the goddess Earth, to Neptune, Themis, and others; but it was at length assigned to Apollo, with whom it ever after remained. A priestess was appointed, whose office it was to inhale the hallowed air, and who was named the Pythia. She was prepared for this duty by previous ablution at the fountain of Castalia, and being crowned with laurel, was seated upon a tripod similarly adorned, which was placed over the chasm whence the divine afflatus proceeded. Her inspired words while thus situated were interpreted by the priests. The announcements of the oracle to those by whom it was consulted were originally made in verse; but it having been sarcastically remarked that Apollo, the god of poetry, was himself sadly deficient in the art of which he was the patron, they were subsequently given in prose. It was usual for those who took the advice of the oracle to make rich presents to the god. By this means a vast amount of wealth was amassed at Delphi, as we learn more particularly from the minute descriptions of Herodotus and Pausanias, and the institution rose to great splendor. From the universal veneration in which it was held, it came also to be chosen as a safe depository for much of the riches of the several states of Greece. Its sacred character however did not always prove a sufficient defence against violence and rapacity, and more than once it was plundered of its

treasures. [DELPHI.] Besides the oracles of Jupiter and Apollo at Dodona and Delphi, that of Trophonius, near Lebadeia in Bœotia, may be mentioned, as having been held in high estimation. There were many other oracles in Greece, but of less repute.

Among the other most noted oracles of antiquity were that of Jupiter Ammon in the desert of Libya, that of the Branchidæ in Ionia, of Pella in Macedonia, of Sinope in Paphlagonia, of the head of Orpheus at Lesbos, &c. Most of the heathen deities and even the demigods and heroes had oracles of their own. There were also current in Greece numerous so-called prophecies, the productions of individuals who were probably supposed to speak under a divine influence. Such were those of Bacis and Mæseus, in which the battle of Salamis was predicted, and that of Lysistratus, an Athenian. (Herod., viii. 96.) But these productions are perhaps more appropriately considered under the head of *Πρόφηται*; though Herodotus applies to them the same name (*χρησμός*) as to the responses from Delphi and other oracular places. As to the Sibylline oracles see *SIBYL*.

Though the Romans had various modes of ascertaining the will of the deities, it does not appear that oracles like those of Delphi or Dodona were ever established among them; and we find that the oracles of Greece, and particularly the far-famed oracle of Delphi, were consulted by them on many important occasions. (Livy, v. 15; xxii. 57, &c.)

Among the Jews, the Urim and Thummim, which by an extraordinary brightness made known the will of Jehovah, bore a striking resemblance to the heathen oracles; and the oracle of Bathcol, or *daughter of the voice*, which was originated after the death of Malachi, was completely identical with them.

The modes in which oracular responses were delivered were very various. At Dodona they issued from the hollow of an oak, at Delphi they were delivered by the Pythia, and at the oracle of Ammon they were pronounced by the priests. At Memphis a favourable or unfavourable answer was understood to be returned, according as Apis received or rejected what was presented to him. [APIS.] Sometimes the reply was given by letter; and sometimes the required information could be obtained only by casting lots—the lots being dice with certain characters engraved on them, the meaning of which was ascertained by referring to an explanatory table. Dreams, visions, and preternatural voices also announced the will of the divinities.

The importance attached by the Greeks and Romans to oracular responses is a striking feature in the history of those people. Hardly any enterprise, whether public or private, of any moment, was undertaken without recourse being had to them, and their sanction being obtained. In later times indeed their influence was greatly diminished, and thus gradually fell into disrepute. Cicero affirms that long before his age even the Delphic oracle was regarded by many with contempt; and there is little doubt that oracles were considered by philosophers as nothing different from what they really were, and by politicians as instruments which could be used for their purposes. The reply of Cato to Labienus, who wished him, after the battle of Pharsalia, to consult the oracle of Jupiter Ammon, embodies the opinion of that eminent Stoic respecting the propriety of thus questioning the gods. 'On what account, Labienus, would you have me consult Jupiter? Should I ask him whether it be better to lose life than liberty? Whether life be a real good? We have within us, Labienus, an oracle that can answer all these questions. Nothing happens but by the order of God. Let us not require of him to repeat to us what he has sufficiently engraved on our hearts. Truth has not withdrawn into these deserts; it is not engraven on the sands of Libya. . . . Let the inconstant and those that are subject to waver according to events have recourse to oracles. For my part I find in nature everything that can inspire the most constant resolution. The coward, as well as the brave, cannot escape death. Jupiter can tell us no more.' (Lucan, *Pharsalia*, lib. ix., v. 566-584.)

The question has been gravely discussed, whether oracular responses ought to be ascribed to mere human ingenuity and wisdom, or to diabolical agency. Most of the Christian fathers maintained that they ought to be ascribed to the latter. Allusion is made to this opinion in the first book of 'Paradise Lost,' where the spirits of Pandemonium are described as having taken possession of the various idols of

the heathen world. There is nothing however in the history of the antient oracles to countenance such a notion, or to lead to the belief that a supernatural cunning and skill directed them. Their replies to those who consulted them were for the most part obscurely and equivocally expressed, and so as to admit of different explanations, according as the wishes of the inquirer might suggest, or the event determine. And even in those instances where trial was designedly made of the reality of their pretensions, it is not difficult to account for the success with which they stood the test, without calling in the assistance of demoniacal instrumentality.

Another circumstance respecting the oracles, which has given birth to much controversy, is, the time when they ceased altogether to give responses. Eusebius was the first who propounded the opinion that they became silent ever after the birth of Christ, and many writers, willing thus to do honour to the author of Christianity, have given it their support. Milton makes allusion to this theory also in the most magnificent of all his minor poems, 'The Hymn of the Nativity;' and in lines of solemn and elevated beauty, of which the following are the commencement, pictures the consternation of the heathen idols at the advent of the Saviour:—

\* The oracles are dumb,  
No voice or hideous hum  
Rings through the arch'd roof in words deceiving.  
Apollo from his shrine  
Can no more divine,  
With hollow shriek the steep of Delphos leaving.  
No nightly trance or breathed spell  
Inspires the pale-eyed priest from the prophetic cell.

But the circumstance that may thus be made available for the purposes of poetical ornament, happens unfortunately to be contrary to fact. It appears from the edicts of the emperors Theodosius, Gratian, and Valentinian, that oracles existed and were occasionally at least consulted till so late as A.D. 358. About that period they entirely ceased, though for several centuries previous they had sunk very low in public esteem. So few resorted to them, that it was no longer a matter of interest to maintain them. Towards this consummation Christianity powerfully contributed, by the superior enlightenment which it carried along with it wherever it was introduced, and by the display which it made of the falsehood and folly of the superstitions which it was destined to overthrow. The following works treat of oracles:—Cicero, *De Divinatione et Fato*; Clusens (Daniel), *De Oraculis Gentilium*, 1673; Dale (Anton. Van), *De Oraculis Ethnicorum*, 1683; *An attempt to prove that the Greeks borrowed the Story of their Oracles from the Holy Scriptures*, by E. Dickinson, 1686; Fontenelle (Bernard le Bovier), *Histoire des Oracles*, 1687; Bulenger (Julius Cesar), *De Oraculis et Vatribus*, 1699; Dr. Bengo Collier's *Christianity compared with Hinduism, Mohammedanism, the Antient Philosophy, &c.*; Clavier, *Mémoire sur les Oracles des Anciens*, 1819.

ORAN. [ALGIERS.]

ORAN-ELF. [BOTHNIA.]

ORANGE. In the article CITRUS the different species of this genus have been described, as well as the more remarkable varieties of the orange. It is there stated that India and China are probably the native countries of the orange tribe; and also that from the observations of Dr. Wallich and other Indian botanists, the orange, the lemon, lime, and citron were all that could be distinguished as distinct species. Since then Dr. Royle has stated (*Illustr. Him. Bot.*, p. 130), that he has found two plants, having the characters of the *lemon* and *citron*, growing wild in the jungly valleys at the foot of the Himalayas, in the tract between the Ganges and Jumna rivers, which, when transferred to gardens, retained their characters. He further states that from the Rungpore forests a round kind of *lime* is obtained; while in those of Silhet, as well as on the sides of the Neelgherries, the *orange* is described as being found wild.

Captain Turner, in the account of his journey to Teshoo Loombo, mentions the orange as delicious; and Mr. Saunders, who accompanied him, describes many orange and lime trees as found at the foot of the hills in approaching Buxedwar. The various kinds of sweet lime and lemon are also common in India; though the shaddock is probably of foreign origin, as it is usually called Batavi numbo, or Batavian lemon. Hence there can be no doubt of the orange, lemon, lime, and citron being natives of India, though it is

probable that some of the species are also indigenous in China, as is the case with many genera and even species which are common to the Himalayan mountains and to the flora of China. That it was introduced into Europe from India, either directly or through the medium of the Arabs or Persians, is probable from the similarity of the names; the orange being in Sanscrit *nagrunjan*, Hindu *narungee*, Arabic *narunj*, Spanish *naranja*, Italian *arunco*, while the lemon is in Sanscrit *neembooka*, Bengalee *neeboo*, Hindu *neemoo* and *leemoo*, Arabic *limon*, whence the European *limon* and *lemon*. But nothing in the history of vegetables is more difficult to determine than the native country of cultivated plants. There was always much communication between India and the Red Sea, and the Arabs also introduced many Indian plants into their dominions. The lemon and orange are common in Abyssinia. Bruce says the lemon is indigenous; and Alvarez speaks of lemons and oranges in parts which Bruce did not visit. (See the *Travels of Alvarez*.)

The orange has been adduced (*Spectator*, No. 155) as a rare instance of a plant vigorous enough to have at once beautiful shining leaves, fragrant flowers, and delicious nourishing fruit. But it is still more remarkable as a fruit of very warm southern countries which has been transferred to Europe and succeeds well in the open air in some parts of Italy. This is probably owing to its being a shrub which does not ripen its fruit even in India until the cold weather or winter of that country. It is thus naturally disposed to bear a greater degree of cold, and thus has been able to travel from India and China to the southern shores of Europe, and find a congenial climate in the equable and temperate climate of the Azores. It is often made a subject of discussion whether the orange, lemon, and citron were known to the antients. There does not appear to be any evidence of sufficient weight in favour of the two former, but it is extremely probable that the citron was the Assyrian, Median, or Persian apple of the antients. Dr. Royle has remarked it as worthy of notice that the Persian and Arabian authors, when describing them, do not give any Greek synonyms of either the orange or lemon. But of the citron they state *marseeska* to be the Greek and *atrogha* the Syrian name, the former of which has not yet been traced out, but the latter appears of the same origin as the Arabic *ooteruj*. The Sanscrit name of the citron is *Beeja poorā*, and the Persian *toorunj*; by the latter name it is also known in the north-western provinces of India.

The orange-tree, being a native of warm southern latitudes, is a remarkable instance of one which gives employment to and forms even an article of commerce from the southern to the more northern European nations. Thus, it is exported from Italy and Malta, as well as from the south of Spain and from Portugal, but in very large quantities from the Azores. Its cultivation is profitable not only on account of the esteem in which the fruit is held, but also from the extreme prolificness of the tree, so that the fruit is sold even in England at a price not much above and sometimes even for less than our own apples and pears.

Oranges are imported, as well as lemons, packed in boxes, and wrapped up separately in paper. The entries for home consumption, in 1831 and 1832, as calculated by Mr. McCulloch, amounted on an average to 270,606 boxes a year, and assuming each box to contain 700 oranges and lemons, the numbers amounted to 189,424,000, and the duty, on an average of the above years, to 61,036*l.* a year.

The citron is considered to have been first cultivated in Italy by Palladius, in the second century, but the orange not until the fourteenth century; it is probable, from the name, that it was first introduced by the Arabs into Spain, 'where fruits of fragrance blush on every tree,' and where are seen 'the orange tints that gild the greenest bough.' They can bear the open air also at Nice, Genoa, and Naples, but at Florence and Milan, and often at Rome, they require the temporary protection of a shed. They are usually planted in boxes, and removed from the conservatory into the open air in summer, in France as well as in England; but since the introduction of the great variety of flowers from all countries, orangeries and fine specimens of orange and citron trees have been less in fashion, though none are more desirable on account of the combination of elegant verdure, the grateful odour of the flowers, and the rich appearance of the fruit. They have been cultivated in England since 1492; and Mr. Loudon states that at the Wilderness, Kent, there are three trees in boxes, not sur-



passed by any trees so grown in Europe; and that at Saltcombe in Devonshire there are in a few gardens orange-trees which have withstood the winter in the open air for upwards of a hundred years. They are propagated either by seeds, by cuttings, by layers, by grafting, or inoculation. The plants grown from seeds require so long to come to perfection, that they are seldom so propagated in England. The most regular and garden-like culture is in the orange orchards at Nervi, Monaco, and other places in the neighbourhood of Genoa. At the former are the orange nurseries which may be said to supply all Europe with trees, though the cultivation is of a very indifferent character, but the fine climate, strong clayey soil, and abundant manurings supply the place of more skillful treatment. Budding and grafting are performed in England at the usual season for such operations, but they may be performed at any time when the sap is in motion. Mr. Henderson, of Woodhall, one of the most successful growers of the Citrus tribe, has given a full description of the practices he adopts (*Caled. Hort. Mem.*, iii. 308; and Loudon's *Encycl. of Gardening*), and considers cuttings as the quickest mode of getting plants. At Genoa and Florence the trees are grown in a strong yellow clay which is richly manured. The French, in preparing a compost, compensate for quantity by richness of manure. Henderson takes one part of light brown mould from a piece of ground that has not been cropped or manured for many years, one part of peat earth such as is used for growing heath, two parts of river-sand, or pit-sand, if it be free from mineral substances, and one part of rotted hot-bed dung, with one part of rotted leaves of trees, and mixes them all well together, so as to form a compact soil of uniform quality.

Though orange-trees grow exceedingly well in pots and boxes, yet to have them produce the finest crop of fruit, they should be planted in the ground like peach-trees, or as standard cherry-trees in a conservatory, but the largest fruit is produced when the trees are planted against the back wall trellis of a narrow house.

(See the work of Risso of Nice and Poiteaux of Versailles, *Histoire Naturelle des Oranges*, where 169 sorts are described, and 105 of them figured; also that of Gallezio, *Traité du genre Citrus*, who has given an account of the 40 different kinds cultivated in Italy; and Mr. Loudon's *Encycl. of Gardening*.)

ORANGE, a town in France, capital of an arrondissement, in the department of Vaucluse, on the road from Paris to Avignon, Aix, and Marseille, 414 miles from Paris through Auxerre and Lyon, in 44° 8' or 44° 9' N. lat. and 4° 48' E. long.

This town existed in the Celtic and Roman periods, and was called Arausio. It is mentioned by Strabo as one of the towns of the Cavares: Mela and Pliny call it Arausio Secundanorum, and the latter describes it as a Roman colony. The epithet Secundanorum has been derived from the designation of the soldiers who were quartered or settled as colonists. Orange contains more Roman antiquities than most other towns in France, and may vie with the cities of Italy. A triumphal arch, called by the inhabitants of the district the arch of Marius, but which is probably of the age of Augustus, stands in the middle of a field on the north side of the town, near the road from Paris and Lyon: it is about 60 feet high, and has three archways, of which the middle one, intended for carriages, is larger than the other two. The vault of the centre arch is richly sculptured. Between the arches are fluted columns of the Corinthian order, most of them much decayed through age, and others are entirely destroyed. The attics are adorned with reliefs, much decayed, but of great archæological interest: on one of these the name Mario, among others, inscribed on a trophy, has given rise to the general opinion as to the person to whom the arch was erected. The sides of this triumphal arch are decorated with columns and reliefs. Another remarkable antiquity, a ruined wall, the back of the scene or stage of a theatre, is in the centre of the town: it is composed of large stones, joined without cement, and is altogether a magnificent piece of masonry. The amphitheatre, of which the traces were visible till of late years, has gradually disappeared, the stones having been carried away to be used in the erection of new houses. Of an aqueduct which brought water to the town there are no remains, except at Vaison, which is several miles distant. There are various fragments of antiquity in private houses

The Visigoths and Burgundians got possession of the town on the downfall of the Roman empire, and from thence it passed to the Franks. In the middle ages it was the capital of a principality, which, after passing through different families, came to that of Nassau. On the death of William III. of England, who held it, it was claimed by the king of Prussia as his heir; and the king of Prussia ceded it to the king of France in exchange for the town and territory of Guelder. It was annexed to Dauphiné upon the establishment of the division into departments. The title Prince of Orange is retained by the royal family of Holland. [NASSAU, HOUSE OF.]

The town of Orange is in a delightful country, and presents a pleasing appearance: it is however really ill built, with narrow, crooked, and ill-paved streets. There are several squares, and some tolerably handsome fountains. There are several parish churches, one of which was formerly a cathedral, for Orange was the seat of a bishop before the Revolution; and a Protestant place of worship, remarkable for the boldness of its architecture. The population, in 1831, was 6211 for the town, or 9123 for the whole commune; in 1836, 8874 for the commune. The inhabitants manufacture printed calicos, handkerchiefs, and throw silk; and trade in corn of all kinds, fruits, wine, brandy, honey, oil, wool, silk, saffron, madder, and truffes. There are five yearly fairs. The cultivation of the olive commences in the neighbourhood of Orange. There are in the town several government offices, a high-school, a school of agriculture, science, and arts, and an hospital.

The arrondissement of Orange comprehends an area of 377 square miles, and includes 48 communes. It is divided into seven cantons, or districts, each under a justice of peace. The population, in 1831, was 66,653; in 1836 it was 67,443. (*Communication from Orange, &c.*)

ORANGE, River. [CAPE OF GOOD HOPE.]

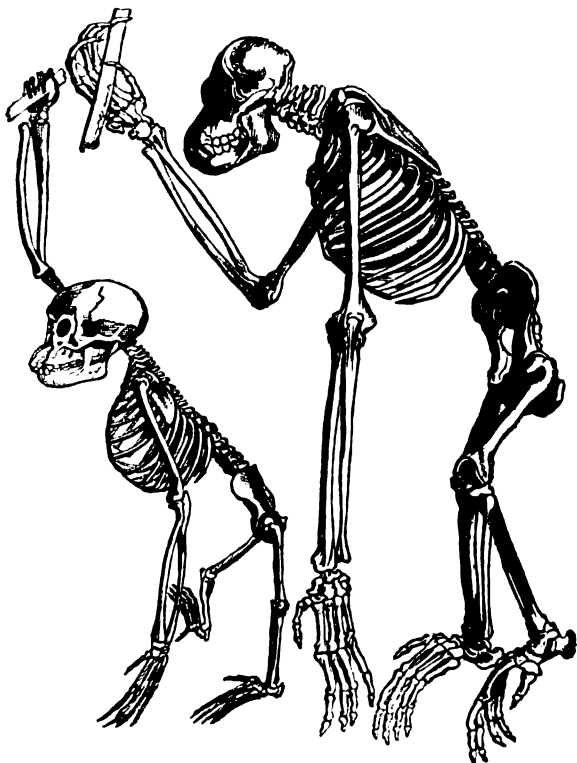
ORANG-UTAN, or ORANG OUTANG, named by which the *Pithecus Satyrus* of Geoffroy (*Simia Satyrus* Linn.), the *Red Orang*, is now generally designated. In the articles APE and CHIMPANZEE much will be found relating to this curious form and its approximations. But the animal is so interesting, that nothing but want of space, which readers not zoological might think unjustifiably occupied, prevents us from entering at large into the subject, and giving a correct figure from the life; for, with few exceptions, artists are in the habit of depicting this animal, as well as the *Chimpanzee*, sometimes with and sometimes without support, in an erect position—an unnatural attitude, against which its whole form and structure militate. We must here however confine ourselves to a mere description of the species, with figures of the skeletons of the young and adult, from Professor Owen: these skeletons will, at once strike the observer with their admirable adaptation for quadrupedism or cheiroped machinery and arboreal habits, and their inaptitude for erect progression.

Subgenus *Pithecus*.

Muzzle large, elongated, somewhat rounded anteriorly, forehead sloping backwards; slight supraciliary ridges, but strong sagittal and lambdoidal crests. *Facial angle* 30°. *Auricles* small. Twelve pairs of ribs; bones of the sternum in a double alternate row. *Arms* reaching to the ankle-joint. No *ligamentum teres* in the hip joint. Feet long and narrow; *hallux* not extending to the end of the metacarpal bone of the adjoining toe; often wanting the ungual phalanx and nail. *Canines* very large, their apices extending beyond the intervals of the opposite teeth. *Intermaxillary bones* ankylosed to the maxillaries during the second or permanent dentition. *Height* under five feet.

*Habitat*.—The islands of Borneo and Sumatra. (Owen.) Professor Owen remarks that the young individual exhibits the anthropoid character in the relative smallness of the face to the cranium, resulting from the state of dentition, but that it corresponds with the adult skeleton in the number of ribs and in the relative proportions of the upper and lower extremities. With regard to the number of vertebrae, he observes that the figure of the adult skeleton, which was taken by permission of the board of curators from the specimen in the museum of the Royal College of Surgeons, exhibits the abnormal number of five lumbar vertebrae instead of four, which is the number existing in the trunk of the mature *Orang* preserved in the museum of the Zoological Society of London, and in the skeleton in the museum of comparative anatomy in the Jardin des Plantes.

The student will do well to study carefully the whole of the Professor's valuable remarks and beautifully accurate illustrations relating to the *Orangs*, or great tailless *Apes of Asia and Africa*, in the *Transactions of the Zoological Society of London*. The form of the living animal and its habits in captivity will have been familiar to most of our London readers from their opportunities of observing the department of *Jenny*, the *Red Orang*, which died this year (1839) in the gardens of that Society in the Regent's Park.



Side view of the skeletons of *Pithecus Satyrus*, young and adult (from Owen).

**ORATORIO** (Ital.), a sacred musical composition, consisting of airs, duets, &c., and choruses. The text is generally a dramatic poem, as Handel's *Samson* and Cimarosa's *Sacrificio d'Abramo*. Sometimes it takes the form of a narrative, as *Israel in Egypt*; and occasionally it is of a mixed kind, as Haydn's *Creation*. *The Messiah* is a collection of passages from our received translation of the Scriptures.

Concerning the origin of the Oratorio, Dr. Brown, Sir John Hawkins, and others seem to have misunderstood the *Père Menestrier*, who, in his work *Des Représentations en Musique*, attributes to the pilgrims, on their return from the Holy Land, not the introduction of what we term oratorios, as those writers suppose, but of the sacred dramas called *Mysteries*. And the learned Jesuit is perhaps himself in error on this subject. It is Warton's opinion that about the eighth century the merchants who frequented the fairs, employing every art to draw numbers together, were accompanied by jugglers, minstrels, and buffoons, who were the source of great amusement to the people. The clergy, thinking that such entertainments tended to irreligion, proscribed them; but their censures and fulminations being disregarded, they took into their own hands the management of popular recreations—they turned actors—and, instead of profane mummeries, presented stories taken from legends or from the Bible. (*History of Poetry*.) Voltaire conjectures that religious dramas came from Constantinople, where, about the fourth century, Gregory of Nazianzus, an archbishop, and one of the fathers of the church, banished plays from the stage of that city, and introduced stories from the Old and New Testament. As the ancient Greek Tragedy was originally a religious representation, a transition was made on the same plan, and the choruses turned into Christian hymns. 'This opinion,' says the candid Warton, 'will acquire probability, if we consider the early commercial intercourse between Italy and Constantinople.' Admitting

this, we need seek no further for the original source of the sacred musical drama.

As regards the more recent introduction of the Oratorio, Crescimbeni, in his *Comentarij*, tells us that it is attributable to San Filippo Neri, born in 1515, who, in his chapel,—('nel suo oratorio')—after sermons and other devotions, in order to allure young people to pious offices, and to detain them from earthly pleasure, had hymns and psalms sung by one or more voices. [NERI.] Bourdelot is rather more circumstantial on this subject. He says, S. Philippe de Nery, a native of Florence, founder, in 1540, of the congregation of the Priests of the Oratory in Italy, observing the taste and passion of the Romans for musical entertainments, determined to afford the nobles and people the means of enjoying them on Sundays and festivals in his church, and engaged for this purpose the ablest poets and composers, who produced dialogues in verse on the principal subjects of Scripture, which he caused to be performed by the most beautiful voices in Rome, accompanied by all sorts of instruments. These performances consisted of airs, duets, trios, and recitatives for four voices: the subjects were, Job and his Friends; the Prodigal Son received by his father; the Angel Gabriel with the Virgin; and the Mystery of the Incarnation. Nothing was spared to render these attractive, the novelty and perfection whereof drew a crowd of auditors, who were delighted with the performances, and contributed largely, by admission money, to the expenses incurred. Hence are derived what we now call Oratorios, or sacred representations. (*Histoire de la Musique*, 1743, i. 256.) Some of these poems were printed, under the title of *Laudi Spirituali*, and among the first authors of them was P. Agostino Manni. One of the most remarkable was entitled *Rappresentazione di Anima e di Corpo*, del Signor Emilio del Cavalieri, per recitar cantando. It was the first attempt in the recitative style, and performed in action, on a stage erected in the church of *Santa Maria della Vallicella* at Rome, with scenes, dances, &c., as appears from the editor's dedication to Cardinal Aldobrandini, and the composer's instructions for the performance. From the latter Dr. Burney (*Hist.*, iv. 88) gives some curious extracts, among which are the following:—

The accompanying instruments—namely, a double lyre, a harpsichord, a large guitar, and two flutes—to be behind the scenes; but the performers are desired to have instruments in their hands, as the appearing to play would help the illusion.

The books of the words were printed. Instead of the modern overture, a madrigal, with all the parts doubled, and fully accompanied, is recommended.

When the curtain rises, two youths, who recite the prologue, appear. Then *Time*, one of the characters, comes on, and has the note with which he is to begin given him by the instruments behind the scenes. The *chorus* is to be placed on the stage, part sitting and part standing; and when they sing they are to be in motion, with gestures.

*Il Corpo* (the body), at the words *Si che hormai alma via*, throws away his ornaments. The *World and Human Life* are to be gaily dressed; and when divested of their trappings, are to appear poor and wretched; and finally dead carcases.

The performance may conclude with or without a dance. If without, the last chorus is to be doubled in all its parts. But if a dance is preferred, a verse beginning '*Chiostrì altissimi*' is to be sung, accompanied reverentially by the dance. During the ritornels the four principal dancers are to perform a ballet, *saltato con capriole* (danced with *capers*), without singing. They may sometimes use the *galliard* step, sometimes the *canary*, and sometimes the *courant*.

The name of *Oratorios* was given, some think, to these performances, because they owed their birth to the *priests of the Oratory*; we are however more inclined to derive the term from the place, the *oratorio* (*oratorium*, oratory, or small chapel), in which they were first heard. But the word does not appear to have been in use till about the year 1630, when Balducci applied it to two of his sacred poems.

The unfortunate Stradella was one of the first of those who distinguished themselves in this exalted kind of composition [STRADELLA]; his '*Oratorio di S. Gio. Battista*,' produced about the year 1670, is analysed and much praised by Burney (iv. 105). A fine chorus from this, in five parts, is printed in the 4th vol. of *The Fitzwilliam Music*. The increasing popularity of the sacred drama at length induc-



poets of eminence to employ their pens in its service. Apostolo Zeno, the Imperial poet-laureate, produced seventeen works of this kind, under the title of *Azioni Sacre*, most of which were set by Caldara, Imperial vice-chapel-master to Leopold I., whose reputation as a composer of sacred music deservedly stands high. The first of them, *Sisara*, was performed in 1717. Metastasio wrote seven *Azioni*, of which Caldara set two; the first, *La Passione*, in 1730. This was re-set by Jomelli, and is justly reckoned among the best of his works.

The Oratorio was introduced into England in 1720, when Handel set *Esther*—Racine's tragedy abridged and altered by Mr. Humphreys—for the chapel of the duke of Chandos (Pope's *Timon*) at Cannons. This, in 1731, was performed by the Children of the Chapel-Royal, at the house of their master, Bernard Gates. The next year it was publicly produced, as appears from the following advertisement in the *Daily Journal*:—'By His Majesty's command, at the King's Theatre in the Haymarket, on Tuesday, the 2nd of May, will be performed the sacred story of *Esther*, an oratorio in English, formerly composed by Mr. Handel, and now revived by him, with several additions, and to be performed by a great number of voices and instruments. N.B. There will be no acting on the stage, but the house will be fitted up in a decent manner for the audience.' The success of this was of the most decided and encouraging kind: but for an account of the great master's other oratorios, and of his inducement for first producing them, we refer to a former volume. [HANDEL.] The custom of performing oratorios on the Wednesdays and Fridays in Lent is to be dated from 1737, from which time they were, with few intermissions, continued till a very recent period. Handel was succeeded in this musical speculation by his friend J. C. Smith, who was followed by Stanley and the elder Linley. [STANLEY; LINLEY.] Linley and Dr. Arnold then in conjunction most successfully carried on the oratorios, which were continued by the latter, on the retirement of his colleague. [ARNOLD.] An opposition was now started by Ashley, who had been active as a subordinate agent at the Commemoration of Handel in 1784. This person soon transformed the performances into secular and often vulgar concerts, though retaining the original name; and from that time the oratorios began to degenerate; till at length, having been for some years carried on by different persons, and generally at a loss, they ceased altogether. Though it would be unjust not to admit that, even during this unfavourable interval, there were two or three seasons that reflected some credit on the managers, in which *The Messiah*, with Mozart's added accompaniments, was first publicly produced in London, and also Beethoven's *Mount of Olives*.

**ORATORY.** The principal design of oratory is to convince or persuade. It contemplates the investigation of truth only as a secondary object. Assuming as its basis certain supposed or admitted principles or facts, its aim is, by presenting these in the form best adapted to win the assent of the understanding and impress the heart, to deter from or incline to a particular mode of resolution and action. This, the chief end of oratory, ought never to be left out of sight in any disquisition on that subject, inasmuch as upon it the general theory of the art is founded.

At a very early period, as appears from the 'Iliad,' the oratorical art was held in high estimation among the Greeks. According to Quintilian however nearly the first person by whom it was properly cultivated was Empedocles, the date of whose birth is unknown; but his flourishing period was about 450 B.C. Corax and Tisias, the earliest writers on the art, were both natives of Sicily. (Quintil., *Instit. Orat.*, iii., c. 1.) Contemporary with them was Gorgias, also a native of Sicily, who was so distinguished for his eloquence that a golden statue was erected to him at Delphi. He, together with Protagoras of Abdera, Prodicus of Ceos, and Thrasymachus of Calchedon, are mentioned as the first who treated of common-places (*communes loci*). The most celebrated disciple of Gorgias was Isocrates, whom Cicero describes as the greatest master and teacher of the art. The treatise of Aristotle on Rhetoric is the oldest extant treatise on the rhetorical art, and one of the most valuable books which has been preserved from ancient times. Demosthenes, who probably enjoyed the instruction both of Isocrates and of Isæus, by incessant application overcame the obstacles which nature had placed in the way of his becoming an orator, and attained a degree of excellence in his art which

has immortalised his name. His opponent and rival, Æschines, after his banishment, is said to have taught rhetoric at Rhodes. We have no treatise on the art by either of these great masters, but we possess, in their extant orations, models which are more valuable than any treatise could have been. Theodectes and Theophrastus, scholars of Aristotle, were both authors of rhetorical treatises (Fabric., *Bibl. Gr.*, v. 2, p. 241); and after the philosophers, particularly those of the Stoic and Peripatetic sects, bestowed much attention upon the rules of oratory. A valuable extant treatise upon composition (*ῥητορικὴ*) is ascribed to Demetrius Phalereus; and Dionysius of Halicarnassus is the author of a treatise of Rhetoric, and of critical remarks on the Greek orators, who deserve a careful perusal. Besides those that have been named, other Greek orators of later times are spoken of by Quintilian, among whom are Hermagoras, Athenæus, Apollonius Molon of Rhodes, who was one of Ciceronian masters, Arius Cæcilius, Apollonius of Pergamus, and Theodorus of Gadara. After Quintilian, the writers of chief note are Hermogenes and Longinus.

The art of oratory was in a state of maturity in Greece before it even began to be studied at Rome. So late as 161, the senate passed a decree expelling the philosophers and rhetoricians from the city. (Gell., xv. 1.) Six years afterwards, however, Carneades, Critolaus, and Diogenes, having come as ambassadors from Athens to Rome, the Roman youth were attracted by their eloquence that they determined to commence the study of the art. It is stated by Seneca that Lucius Plotinus, a Gaul, was the first who taught oratory at Rome. This profession was for awhile confined to freed men, but it was at length adopted by Blandus of the equestrian order. He was succeeded by others, of whom some particulars have been recorded by Suetonius. The following names of Roman rhetorical writers are given by Quintilian: Marcus Cato the censor, Antony the orator, Cornificius, Stertinius, and Gallio; and in Quintilian's catalogue, Virginius, Pliny, and Rutilius. Cicero, whose name we have intentionally omitted in the above list, as he was the most illustrious of the Roman orators, was also one of the most copious and elegant of the ancient writers on oratory. His treatises on this subject, which are numerous, are respectively entitled: 'Of Invention,' 'Of Topics,' 'Of the Divisions of Oratory,' 'The Orator, or Orator's Education,' 'Of Famous Orators,' and 'Of the Orator.' The last-mentioned work is comprehended in three books, and is in the form of a dialogue. The chief speakers are L. Crassus and M. Antonius; and into the mouth of the former Cicero puts his own opinions. The first book is general, relating to the difficulties of the art of oratory, and the branches of study with which the accomplished orator ought to be conversant. According to Crassus the qualifications of the orator must be of the highest order. The object of his art is to gain speaking the greatest power of which it is susceptible, and he ought to make himself familiar with all departments of learning. Eloquence does not consist in the mere use of artificial rules; such rules are rather deductions from an examination of the qualities of eloquence. The practice of reading, of delivery, and the improvement of the memory, should be diligently attended to by the orator, and above all, he must possess an intimate acquaintance with matters of law. These and other similar positions are controverted by Antonius, who maintains that an extensive and minute knowledge of law is not indispensable, and that he is an orator who can speak on civil and common affairs readily and persuasively.

The second book treats of invention, of disposition, and memory. The first is considered in a threefold point of view, according as it is the design of the speaker to instruct, to persuade, or to delight. Under disposition the various parts of an oration are discussed, viz. the exordium, narration, division, confirmation, refutation, and conclusion. The three kinds of orations, the deliberative, the judicial, and the demonstrative, are also considered, and the book concludes with observations concerning an artificial memory.

In the third book the subject of elocution is taken up; the characters of words, the structure and embellishments of sentences, and other circumstances connected with language and style, are commented on at considerable length. A discussion on action terminates the whole work.

Quintilian, who was himself a rhetorician of high reputation, wrote after Cicero. He had consequently the advantage of the writings of the latter, and his 'Institutions a

Oratory,' in twelve books, are generally regarded as the most complete work on the subject. Certain orations or declamations ascribed to him are still in existence; but as they little accord with his own rules, their genuineness is not universally admitted. [QUINTILIAN.]

It may be observed that the reign of eloquence in Greece was of much longer duration than in Rome. Among the Greeks it took its rise with republican institutions, and continued to flourish down to the time of Alexander the Great, a period of 150 years; in the latter, it began and ended with the age of Cicero. The difference has been ascribed to the more free and popular forms of government that obtained in many Grecian states, and this idea seems to receive countenance from the fact that eloquence and the liberties of Greece were coeval: the one ceased when the other was destroyed. The age of rhetoricians succeeded among the Greeks to that of the orators; and though oratory such as that of Demosthenes and Æschines was no longer permitted by circumstances, yet the teachers of rhetoric among the Greeks cultivated the art as a discipline and also employed it as a kind of theatrical exhibition. Among this class of orators we may enumerate Aristides and others. [ARISTIDES.]

It was the Archbishop of Cambray's opinion that the proper method of forming a system of oratory is to collect it from the best precepts of Aristotle, Cicero, Quintilian, and Longinus. The opinion has been repeated and acted upon by Ward, in one of the few systems which this country has produced.

The elements of oratory are usually comprehended under the four following divisions: *invention, disposition, expression* or *language*, and *delivery*. The first has respect to the character of the thoughts, the second to the manner of their arrangement, and the third and fourth to words, sentences, style, utterance, &c.

Besides the common observations that may be made on any subject, there are peculiar ideas appropriate to the exposition and illustration of each peculiar subject, and among these some which are more appropriate for this purpose than others. These it is the business of the orator to discover, and the discovery of them is termed *invention*.

Where argument is requisite, those arguments which are most powerful ought to be adduced; where objections are apprehended, they must be refuted; and where declamation is resorted to, the incentives best adapted to excite the passions and engage them in behalf of the cause which the speaker advocates must be brought forward. The Greek rhetoricians specified under invention a great variety of particulars intended to assist the orator, whatever might be the matter on which he was required to employ his eloquence: these they called *topics* (*τορικά*, the *loci* of Cicero, *Topic.*, c. 2), and divided them into internal topics, or commonplaces, and external topics, or testimonies. Internal topics are such as arise out of the subject itself. As given by Cicero and Quintilian, they amount to sixteen in number. These are—definition, enumeration, notation, genus, species, antecedents, consequents, adjuncts, conjugates, cause, effect, contraries, opposites, similitude, dissimilitude, comparison. The first three comprehend the whole thing to which they have reference: definition explains the nature of a thing; enumeration takes in all its parts; and notation gives the signification of words. Of the remaining thirteen, some contain part of the thing spoken of, and the others its various properties, circumstances, &c. Genus comprehends several species of things of different kinds. Species, all individuals of the same kind. Antecedents are such things as, being admitted, imply the necessary or probable existence of others. Adjuncts are adventitious qualities of things and circumstances not necessarily connected with them. Conjugates are words having the same origin with one another, as *wise, wisely, wisdom*. A cause is that by which anything exists; and an effect, that which proceeds from a cause. Contraries are things which, included in one genus, are the farthest removed from each other, so that what is affirmed of the one is denied of the other. Opposites are things which, though repugnant, are not directly contrary. Similitude and dissimilitude are the agreement or disagreement of things in quality. Comparison traces contrarieties or resemblances in other particulars, as when a thing is compared with its greater or its equal or its less.

External topics, or testimonies, are such as do not arise from the subject itself, but are furnished from without: they are either divine or human. The first, where clearly

ascertained, are sufficient of themselves to determine any question; the last are reduced to three, writings, witnesses, and contracts.

The ancient rhetoricians paid great attention to what were termed the states of a controversy, or the principal points in dispute. These are all comprehended by Cicero in the inquiries, whether a thing is, what it is, and how it is.

In addition to the general sources of argument furnished by the topics, others more particular were specified, suited respectively to demonstrative, deliberative, and judicial discourses.

When the materials of which an oration is to consist have been procured, it next remains to arrange them in a proper form. The thoughts may be excellent in themselves and in relation to their object, yet if they be produced in a confused and disorderly shape, their application perhaps will not be readily apparent, and certainly they will be deprived of much of their force. Hence the second element of oratory, *disposition*, which concerns the right distribution of the ideas. It is necessary that they should succeed each other, if not by a natural connection, at least by an easy sequence, and that the orator should proceed from what is of less to what is of greater importance. Everything inconsequential ought to be avoided, and care must be taken lest the introduction of what is of little moment to the attainment of the purpose in view should obliterate or obscure the recollection of graver and more important considerations previously advanced.

Rhetoricians differ in their statement of the several parts of which an oration consists. In Cicero's work concerning the orator they are mentioned as five—the exordium, narration, division, confirmation, refutation, and conclusion: to these may be added, if necessary, digression, transition, amplification. It is not of consequence however that these divisions should in every case be minutely observed. The orator may on certain occasions, to be determined by his own judgment, break forth without prefatory remark in the middle of his subject. Cicero's often cited oration against Catiline may be mentioned as an instance of this, in which he commences at once with an energy and vehemence that would, under other circumstances, have been reserved for a more advanced stage of his harangue.

Another object to be attended to by the orator is the language and style of his oration. This falls under the head of *expression*. This department of oratory comprehends elegance, composition, dignity.

Elegance consists in perspicuity and purity. Low, obsolete, and foreign terms are to be avoided, as having a disagreeable effect upon the hearer, and being in so far opposed to the object for which oratory is employed. Clearness, on the contrary, must be constantly aimed at, inasmuch as without it the speaker will only be partially understood, and consequently cannot hope to produce the full effect to which he may aspire.

Composition supplies rules for the formation of sentences with the various members, words, and syllables of which they are made up. It is divided into period, order, juncture, and number. The first treats of the structure of sentences; the second, of parts of sentences, namely, words and members; and the last two, of parts of words, or syllables and letters.

Dignity consists in the proper use of tropes and figures.

Style is distinguished into the plain or familiar, the middle or elegant, and the sublime. The characteristics of each are sufficiently indicated in the terms by which they are designated. All of them may with propriety find a place in the same oration; none of them can perhaps be long employed effectually without being relieved by an interchange with the others. The familiar, however entertaining for awhile, is apt to appear rapid at last; the elegant becomes insipid; and the sublime calls for an effort on the part of the listener that can only be sustained for a short time. In lengthened harangues therefore variety is requisite, if the attention and interest of the hearers are to be secured. In the choice of his style the orator must be chiefly determined by the nature of the subject and the character of the audience. On a common and familiar subject, to use lofty and figurative language would be ridiculous, as to use mean and insignificant expressions on a subject in itself noble and elevated would be offensive. In like manner, to address in the same strain a plain and unlettered audience, and a learned and dignified assembly would be impertinent and absurd.

*Delivery* includes everything connected with the utterance of speech, the modulation of the voice, gesture, &c.

The division of oratory by the ancient rhetoricians into the demonstrative or laudatory, the deliberative, and the judicial, has been adverted to. The classification is judicious, and comprehends the several kinds of public speaking still in use. These may be conveniently arranged in the following order: the oratory of the Senate, of the Bar, of the Pulpit, and of the Mob. The oratory of the Stage occupies a place by itself: it is not contemplated in any of the remarks that have yet been made, and requires separate consideration.

The oratory of the senate, or popular oratory, as it is sometimes termed, has respect generally to the welfare and honour of states, which involve an immense number of topics differing in nature and importance. Accordingly this branch of oratory admits of a corresponding variety of style and character. It may be deliberative, or controversial, or declamatory, according to the subject about which it is occupied, or the end to be accomplished. There is perhaps no department of rhetorical excellence which it does not include, and nowhere therefore will the orator find a wider field for the exercise of his powers. It is supposed that in this case he addresses a well-instructed audience; and this circumstance must be allowed to have its due influence in the construction of his oration. He ought, it has been said, to unite the dignity of the statesman with the propriety of the scholar. It may be questioned whether, in this country at least, Demosthenes's thrice-inculcated quality of action is deemed a very essential element of good oratory. It is for the most part but sparingly resorted to, and its employment to the extent that would seem to be implied in the earnestness with which it was enjoined by the Grecian orator, would be considered a better qualification for the orator of the mob than the orator of the senate.

The oratory of the bar is the same as the judicial oratory of the antients. It supposes two parties, plaintiff and defendant. The matters about which it is conversant are the rights of property and the lives and characters of individuals. The object of the orator is to secure success to the party whose interests he advocates, by proving, to the satisfaction of those by whom the cause is to be decided, the justice of his claims or the innocence of his conduct. His oration therefore must be in a great measure strictly argumentative, and constructed with the design of producing conviction. The nature of such an oration may be illustrated by reference to the arguments laid down by the antient rhetoricians as appropriate to judicial discourses in criminal cases. First, there occurs the conjectural state of the question, in which it is inquired whether the party accused would, could, or did do what is laid to his charge; and next the definitive, where the proper name to be assigned to the fact is discussed; further, admitting the truth of the accusation, the criminality of the action may be disputed; and lastly, even granting this, the accused may be defended, and the offence palliated, by pleading the absence of wilful design or bad intention. The province of the oratory of the bar is manifestly more circumscribed than that of the senate. The forensic eloquence of the Greeks and Romans, and particularly the former, differed considerably from what such eloquence must now be, and bore a closer resemblance to the senatorial. Among the Athenians at least the orator was not so much fettered by the provisions of a complex and intricate system of law, or by the existence of innumerable precedents. Besides, the judges in criminal causes were always far more numerous, so that the orator, instead of addressing himself to a few persons, in reality spoke to a small assembly. Even yet however, in all cases which involve great principles, or which possess intrinsic elements of interest, as well as in reply, the forensic orator has full opportunity for the display of the highest rhetorical ingenuity and skill. It may also be observed, that as all courts of justice are open to the public in this country, and as important cases always attract a large audience, the speaker, though in form only addressing a few persons, and sometimes even a single person, with whom the decision rests, is nevertheless actually addressing a large body. This was also the case at Rome, where the judges were frequently few in number, but the bystanders were many.

Some of the public orations of Demosthenes and Cicero are noble specimens of antient eloquence, senatorial and forensic. The eloquence of antiquity indeed generally occupies a more elevated place than that which can be

claimed for modern eloquence. The one is the result of profound and incessant study; the other too frequently the result of hasty and extemporaneous effort.

The influence which the great orators of Greece and Rome were enabled to exercise, in the popular assemblies, in the senate, and in judicial cases, gave to oratory a high degree of importance as a branch of liberal education; and accordingly those who aspired to political distinction, either at Athens or Rome, qualified themselves to appear as public speakers by the most assiduous industry, and by following the instruction of the best masters of their art. The painful labour by which Demosthenes overcame the impediments which nature seemed to have put in the way of his becoming an orator, and the unwearied diligence of Cicero (*Brutus*, c. 90, &c.), are well known. But in modern times little or no attention has been bestowed on oratory as a separate branch of study, and eloquence has come to be more admired as one of the rare gifts of nature than sought after as one of the fruits of art. This seems the principal reason why the orations transmitted to us from antiquity have been so rarely approached, and still more rarely equalled, even by the most distinguished modern speakers, and even in those states whose constitutional forms permit and invite the exercise of oratorical power.

The diffusion of opinions and arguments by means of the press has perhaps contributed in some degree to the present neglect of oratory; for a speaker is mainly known to the public through the press, and it is often more important to him to be *read* than to be *heard*.

Still the power of oratory, in all modern constitutions in which the democratic element enters, is considerable enough to induce any person who has the requisite gifts of nature to cultivate oratory as an art; and it is rather singular in those who aspire to political distinction in states where such constitutions do not prepare themselves for their career by a special study. One reason may be that rhetoric, along with many other antient studies, has been banished from our course of instruction, so that even he who has the desire cannot find the opportunity of perfecting himself under a master. He therefore attains such excellence as he may, solely by practice in those places which want another system he would not have approached without due preparation. The great Roman orator, though distinguished for his profession by assiduous study, left Rome after he had been practising for two years at the bar, and had already begun to be known, for the purpose of improving himself under the best Grecian masters.

Pulpit oratory was unknown to the antients, being the growth of later times. It has for its chief aim to improve men with their duty as moral and religious beings; to lead from vice and excite to the pursuit of virtue; to encourage to elevate, and to awe, by the prospects of immortality, the topics with which it is conversant are of transcendent importance, and ought to be profoundly interesting to all classes of mankind, we can scarcely conceive how any one could find a more favourable sphere. It admits of every diversity of oratorical excellence; but the elevating qualities which ought to be exhibited by the preacher are sincerity, solemnity, and fervour, combined with moral dignity. That so few should have excelled in this department of eloquence must be matter of wonder, as well as of regret. No subjects are so easily susceptible of being made impressive as those which it is the duty of the preacher to proclaim; and every means ought to be employed by which the truths of revelation may be made to penetrate more deeply into the heart of man.

Mob oratory is principally directed to the producing of excitement. Being intended to influence minds which are little cultivated or refined, it requires the plainest and least ornamental style. Here the maxim of Demosthenes formerly alluded to might, as has been hinted, be admitted to all its force. The utmost familiarity of thought and allusion is admissible; and it must be the care of the speaker to give utterance to his thoughts in brief sentences. He must place himself on a level with those whom he addresses, nor can he expect to gain them over to his own purpose without seeming to partake of their prejudices.

The oratory of the stage differs from every other kind of oratory. Its characteristic peculiarity is imitation. Its design is to represent human nature, as embodied in particular individuals and modified by particular circumstances. In order to excellence in this art, an extensive acquaintance with the general principles of human nature is requisite.

and also an accurate knowledge of their workings and developments in individual character. Success must be measured by the closeness of the resemblance. We now proceed to speak more particularly of that part of oratory which relates to *delivery* or, as we shall here term it, *Elocution*.

**ELOCUTION** is that pronunciation which is given to words when they are arranged into sentences and form discourse. It includes the tones of voice, the utterance, and enunciation of the speaker, with the proper accompaniments of countenance and gesture. The art of elocution therefore may be defined to be that system of rules which teaches us to pronounce written or extemporaneous composition with justness, energy, variety, and ease; and agreeably to this definition, good reading or speaking may be considered as that species of delivery which not only expresses the sense of the words so as to be barely understood, but at the same time gives them all the force, beauty, and variety of which they are susceptible.

The Greeks and Romans paid great attention to the study of elocution, and there can be no doubt that their most celebrated orators attained to a high degree of excellence in this branch of their art; but they have left nothing on record which shows that they had made a minute analysis of the speaking voice. They did indeed distinguish its different qualities by such terms as hard, smooth, sharp, clear, hoarse, full, slender, flowing, flexible, shrill, and rigid. They were sensible to the alternations of heavy and light in syllabic utterance: they knew the time of the voice, and regarded its quantities in pronunciation: they gave to loud and soft appropriate places in speech: they perceived the existence of pitch, or variation of high and low; and noted further that the rise and fall in the pronunciation of individual syllables are made by a *concrete* or continuous slide of the voice, as distinguished from the *discrete* notes produced on musical instruments. They designated the pitch of vocal sounds by the term *accent*, making three kinds of accents, the acute, the grave, and the circumflex, which signified severally the rise, the fall, and the turn of the voice, or union of acute and grave on the same syllable. But beyond this they did not go, and it was left to modern inquirers to give that clear and full description of the elements of speech, on which alone any definite instruction can be founded. For the advance which has been made in elocutionary science in modern times we are indebted to the useful labours of Steele, Odell, Walker, Thelwall, Chapman, Smart, and Rush, especially to the last, who has done much to perfect what was begun by others, and whose 'Philosophy of the Human Voice' contains a more minute and satisfactory analysis of the subject than is to be found in any other work. From his book chiefly we shall borrow the substance of this article.

When the letter *a*, as heard in the word *day*, is pronounced simply as an alphabetic element, without intensity or emotion, and as if it were a continuation and not a close of utterance, two sounds are heard continuously successive: the first has the nominal sound of this letter, and issues from the organs with a certain degree of fullness; the last is the element *e*, as heard in *eve*, which gradually diminishes until its close. During the pronunciation, the voice rises, by the concrete or continuous movement, through the interval of a tone, the beginning of the *a* and the termination of the *e* being severally the inferior and superior extremes of that tone. This sound commences full and somewhat abruptly, and gradually decreases in its upward movement, till it finally dies away in the upper extreme of the tone, having the increments of time and rise, and the decrement of fullness, equally progressive. The first portion therefore, or base of this sound, is called the *radical movement*, and the second portion the *vanishing movement*. This sound is called a concrete, or slide, to distinguish it from musical sounds, which (in their *pure* character) continue for a given space of time on a certain point of the scale, and then leap, as it were (*discretely*), to another point either higher or lower. These slides may extend through the space of a tone, or they may be carried up to any point

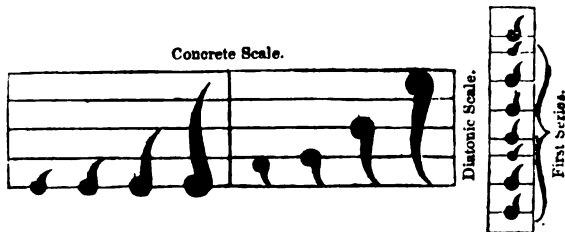
on the scale to which the voice can attain, those intervals which are the most distinctly recognisable by the ear and the most easy of execution being the tone (or second), the third, the fifth, and the octave. The direction also which they take may be either upwards or downwards, the full opening radical however always occupying the first place, and the vanish the second. It also frequently happens that there is a union of the upward and downward, or of the downward and upward movement, on the same syllable: these are called *waves* or *circumflexes*; they may rise and fall through the extent of a tone, or of a third, or of any wider interval of the scale; they are then called *direct waves*: or they may fall and rise through the same extent of pitch, being then called *indirect waves*; they may be *equal*, having their constituent rise and fall through the same extent of pitch; or they may be *unequal*, having either the ascent or the descent longer than the other part.

The succession of the seven sounds of any one series, to which the octave is usually added, is called the Natural or Diatonic Scale. In speech, as in music, it consists of five tones and two semitones, the latter being the spaces between its third and fourth and its seventh and eighth degrees. But a progression may also be formed by semitones; these have only half the extent of pitch which the full tones have: like them, they may be carried upwards or downwards, and they often occur in the form of waves. They serve for the expression of animal distress.

But the succession of discrete sounds may be exhibited under still more minute divisions. These consist of a transition from place to place in pitch, over intervals much smaller than a semitone, each point being, as it were, rapidly touched by a short and abrupt emission of voice. This description may be illustrated by that noise in the throat which is called *gurgling*, and by the neighing of a horse. The analogy here regards principally the momentary duration, frequency, and abruptness of sound, for the gurgling is generally made by a quick iteration in one unvarying line of pitch, whereas in the scale now under consideration each successive pulse of sound is taken at a minute interval above the last, till the series reaches the octave. The precise extent of these small intervals it is very difficult to estimate. They may however be carried concretely through the wider intervals of the scale, provided they do not lose their distinctive character of momentary time and abruptness of utterance. These concretes are used both in laughter and in crying. In the descending scale, the direction not only of the radicals but of the vanishes is downwards. *Intonation* is the act of performing the movements of pitch through the several scales.

There are then *four* scales of pitch for the speaking voice:—

1. The *Concrete*, in which from the outset to the termination of the voice there is no appreciable interval, or interruption of continuity.
2. The *Diatonic*, the transitions of which are principally by whole tones.
3. The *Semitonic*, or *Chromatic*, consisting of an entire succession of semitones.
4. The *Tremulous*, consisting of minute intervals smaller than the semitone.



The *alphabet* is, in our grammars, usually divided into vowels, consonants, mutes, and semivowels; but it will be more useful to class the elements according to their use in intonation. As the number of these elementary sounds in the English language exceeds the literal signs, and some of the letters are made to represent various sounds without any rule of discrimination, it is necessary to use short words of known pronunciation, containing the elementary sounds, with the letters which represent them marked in italics. The elements of articulation are thirty-five, and they may be arranged under three general heads.

- I. The first division embraces those sounds which display

\* Second edition, 8vo. Philadelphia, 1833. A copy of this will be found in the library of the British Museum, where the student may also consult Mr. Steele's 'Essay towards Establishing the Method and Measure of Speech, to be expressed and perpetuated by peculiar symbols,' London, 1775. The second edition was published in 1779, with the title of 'Prosodia Rationalis.' Mr. Odell's work is entitled 'An Essay on the Elements, Accents, and Prosody of the English Language,' 12mo, London, 1805.

the properties of the radical and vanish in the most perfect manner. They are twelve in number, and are heard in the usual sound of the separated italics in the following words:—*a-ll, a-rt, a-n, a-le, o-ur, i-sle, o-ld, ee-l, ou-ze, e-rr,\* e-nd, i-n.*† From their forming the purest and most plastic material of intonation, these are called *Tonic* sounds. They have a more musical quality than the other elements; they are capable of indefinite prolongation; admit of the concrete and tremulous rise and fall through all the intervals of pitch, and may be uttered more forcibly than the other elementary sounds, as well as with more abruptness.

II. The next division includes a number of sounds possessing variously among themselves properties analogous to those of the tonics, but differing in degree. They amount to fourteen, and are marked by the separated italics in the following words:—*B-ow, d-are, g-ive, v-ile, z-one, y-e, w-o, th-en, a-z-ure, si-ng, l-ove, m-ay, n-ot, r-oe.*

From their inferiority to the tonics in all the emphatic and elegant purposes of speech, whilst they admit in some measure of being intonated, or carried concretely through the intervals of pitch, they are called *subtonic* sounds.

III. The remaining nine elements are aspirations, and have not that sort of sound which is called vocality. They are produced by a current of the whispering breath through certain positions of the enunciative organs. They are heard in the words—*U-p, ou-t, ar-k, i-f, ye-s, h-e, wh-eat, th-in, pu-sh.*

As they admit of little or no pitch, and supply no part of the concrete when breathed among the constituents of syllables, they are termed the *Atonic* sounds.

The name of *Abrupt* sounds is also given to three of the subtonics and three of the atonics, namely *b, d, g, p, t, k*, since they confer an *explosive* character on the following tonic, the breath bursting out after a complete occlusion.‡

In conformity to the above division of the letters, and with especial reference to the time which is occupied in pronunciation, syllables are divided into three classes—1st, *Immutable*, such as *at, ap, ek, hap-less, pit-fall, ac-cep-tance*; 2nd, *Mutable*, as *yet, what, grat-itude, des-truc-tion*; 3rd, *Indefinite*, as *go, thee, for, day, man, till, de-lay, be-guile, ex-treme, er-ro-neous*. It is the peculiar nature of this last class of syllables, that to whatever necessary degree their quantity is prolonged, their character is still preserved, while the mutable and the immutable in some cases almost lose their identity by too great an addition to their time. The use of these distinctions will appear in the sequel.

Thus much having been premised, it will be the more easy to understand the general divisions of vocal sound. All the varieties of sound in the human voice may be referred to the following general heads:—

#### Quality, Force, Time, and Pitch §

I. The terms by which the *Quality* or kind of voice is distinguished are rough, smooth, harsh, full, thin, slender, soft, musical, and some others of the same metaphorical structure.

There are three different sorts of voice, the *natural*, the *falsette*, and the *orotund*, to which must be added the *whisper*, which, strictly speaking, is not *voice*. The *natural* is that which we employ in ordinary speaking. It includes a range of pitch from the lowest utterable sound up to that point at which the voice is said to break. At this point the natural voice ceases, and the higher parts of the scale are made by a shriller kind, called the *falsette*, of which the cry, the scream, the yell, and all shrillness are various modes. The name of *orotund* (from *os rotundum*) is given to that natural or improved manner of uttering the elements, which exhibits them with a fullness, clearness, strength, smoothness, and a ringing or musical quality rarely heard in ordinary speech, and which is never found in its highest excel-

lence except as the effect of long and careful culture. This voice is highly agreeable to the ear; it is possessed by actors of eminence, and is peculiarly adapted to set forth the beauties of epic and tragic composition. The *whisper* is a constituent of the atonic elements; but all the tones of the greater part of the subtonics, may likewise be uttered in this mode of sound. The subtonics *r, z, ar, th-en, th* & *whispered*, are not respectively different from the *tonics, s, wh, th-in, sh*.

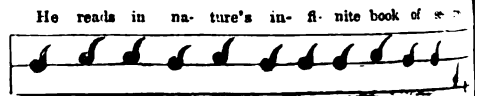
II. For the specifications of *Force* we use the terms strong, weak, feeble, loud, soft, forcible, and faint. These are indefinite in their indication, and without any fixed relationship in degree.

III. *Time*, in the art of speaking, is divided into short, quick, slow, and rapid. These distinctions will suffice for the common purposes of discourse; if more precision is required, a notation will be found in Mr. *Prosodia Rationalis*. The distinction of immutable, mutable, and indefinite syllables has reference to time, has been already treated of.

IV. The meaning of the term *Pitch*, as applied to voice, has been already explained.

We come now to the application of these elementary distinctions to the practical purposes of reading.

In plain narrative or description, the concrete of each syllable is made through the interval of an atonic; the successive concretes have a slight difference of pitch relatively to each other. The appropriation of these to syllables, and the manner in which the successive pitch is varied, are exemplified in the following lines:



If these lines and the enclosed spaces be supposed in proximate order, to denote the difference of pitch, the successions of the radical points, with the issuing vanish, will show the places of the syllables in the superscribed sentence in easy and unimpassioned utterance, though it is not denied that a somewhat different arrangement might also be agreeable. The perception of these successions here exemplified is called (in a restricted sense of the term) the melody of speech.

In simple phraseology, which conveys but little emphatic sentiment, most of the syllables, except two of the last in the sentence, consist of the upward and vanishing tone. The succession of these concretes is made with a variation of pitch, in which any two consecutive concretes never differ from each other more than the interval of a tone, nor do there occur more than two consecutive tones in one direction either upwards or downwards. This is called the *diatonic melody*. The rise of each syllable is called the *concrete pitch* of each syllable, the place which each syllable assumes above or below the preceding, the *radical pitch*. The *current melody* of plain discourse admits of considerable variety, and the forms of radical pitch are all reducible to a limited number of aggregates of the concrete tones, which may be called the *phrases of melody*. Their forms are pointed out by the notation of the following lines:—



The *melody of the cadence*, as distinguished from the current melody, is formed on the two or three last syllables of a sentence, and is effected by a descent of radical pitch through three conjoint degrees, with a downward concrete always on the last, and frequently on the preceding. The form of the cadence has been illustrated in the sentence above; the notation of which has been given above; but there

\* The writer of this article has personal opportunity of knowing that by this word Dr. Rush meant to designate that sound which Mr. Cull represents by *her*.

† If *of* or *oy*, as in *voice* and *boys*, be added as perhaps they ought, the number of the tonics will be thirteen.

‡ It is difficult to decide on the analysis of the elementary sounds represented by the alphabet. That of Dr. Rush is given in the text. The following has been furnished to the writer of this article by Mr. Cull, and, although not free from objections, is more complete.

I. Vowels, as heard in the following syllables:—*all, arm, an, ale, end, eel, her, isle, in, old, ooze, on, os, cube, pull, our, oil.*

II. Consonants. 1. *Voice Consonants*:—*be, do, go, lo, me, no, roe, rat, see, ye, some, sing, azure, then, jew.* 2. *Voiceless Consonants*:—*ap, at, ark, if, hope, quit, sin, chin, thin, thin, when.* In all forty-three elements.

§ To these Dr. Rush adds a fifth, namely, *Abruptness*; but this appears to be resolvable into force and time.



various forms according to the component parts and the sense.

Plain declarative sentences generally take one form or other of the cadence, in order to mark the satisfactory close of the period; and downward concretes are also frequently introduced into what are called loose sentences, to denote that the sense is complete, and that the succeeding clause does not modify that which precedes it. Where, on the contrary, the sense is suspended, as it most commonly is in the middle of a sentence, the concretes must have an upward direction.

For conveying the peculiarities of sentiment or feeling, or, in other words, for the *expression of speech*, a much more varied apparatus is necessary. This expression is effected by quality, time, pause, melody, pitch, the waves, the semitones, the tremor, force, and rhythm, all which are only so many forms of the four general divisions of vocal sound above specified.

I. Most of the elements which range under the general head of *Quality* have already been enumerated. It must however be remarked that they are susceptible of combination with the various modes and degrees of force, time, and pitch. In short, quality of voice must necessarily be united with some of the degrees of the other genera; for, whatever be the kind, it will be either strong or weak; its time must be long or short; and it must be of some definite radical or concrete pitch. Certain qualities of the voice are however exclusively congenial with particular conditions of these other accidents; thus smoothness will more generally affect the moderate degrees of force.

II. *Time*.—The degrees of duration of the voice represented by the terms long, short, and the rate by quick and slow, are among the most effective means of expression; rage, mirth, railery, and impatience affecting a quick time; and slowness of time being the symbol of sorrow, grief, respect, veneration, dignity, apathy, contrition, and all other sentiments which embrace the idea of deliberation. A slow time of discourse, if not made by long quantities on single syllables, would be offensive from its pauses; these two forms of time therefore necessarily involve each other. Slowness of time and long quantity are generally joined with the element of the wave, since the return, or contrary flexure of intervals, is one of the means for producing an extension of time without destroying the equable concrete of speech, or, in other words, without passing into song. The wave of a tone will be perceived in the dignified and appropriate utterance of the syllables marked in italics in the following lines:—

\* Pardon me, thou bleeding piece of earth,  
That I am meek and gentle with these butchers.  
\* Hail, holy light, offspring of heaven, first-born,  
Or of the eternal, co-eternal beam,  
May I express thee, unblamed!

III. The use of *Pause* for the more conspicuous display of sense and sentiment, by separating certain words or aggregates of words from each other, is of great consequence in elocution, but cannot be gone into at length in this article. To these pauses the grammatical points are by no means a sufficient guide. [PUNCTUATION.]

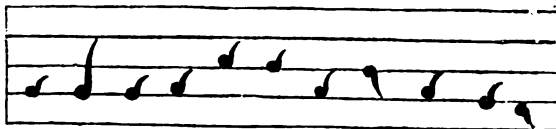
IV. A comprehensive account of *Melody* would properly represent it as produced by a variation in the time, pauses, force, and pitch of the voice, since the well-appointed uses and dispositions of these accidents make up the agreeable impression of speech; but we use it here as relating solely to the successions of radical pitch. Under this head it may be remarked that a predominance of the *monotone* is suited to feelings of dignity, grief, tenderness, solemnity, and serious admonition; that the *alternate phrase* well describes the earnest excitement necessarily produced by the rapid succession of incident; and that a *progression* gradually rising and falling through *the whole compass of the voice* corresponds with a wide variation of force in the sentiment. For illustrations of these modes see Dr. Rush's *Philosophy of the Voice*, pp. 112, 141.

V. *Pitch*.—Discrete pitch is illustrated by the word *must* in the following passage. As it is a syllable which does not admit of prolongation, it is raised discretely a third above the preceding:—

\* If I *must* contend, said he,  
Best with the best, the sander, not the sent.

We have an example of a *concrete rising fifth* on *beau-*, and of a *discrete third* on *mor-*, in the following—  
P. C., No. 1036.

And beau- ty im- mor- tal a- wakes from the tom.



If we suppose that the following words are spoken *interrogatively*, and that they express surprise, the concrete rising fifth must be given to the emphatic syllables:

Give Brutus a statue with his ancestors?

If, on the other hand, the line be read as a *command*, the direction of the concretes will be downwards.

On the word *know*, in the following clause, not only does the voice descend concretely a third or a fifth, but the descent begins discretely a third above the preceding word:—

We know what we worship, for salvation is of the Jews.

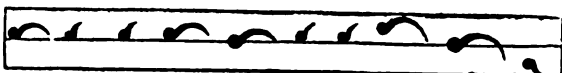
As the diatonic melody is suited to plain narration and description, so will the emphasis be the more strongly marked in proportion to the wider extent of the intervals, whether of concrete or of discrete pitch, which are employed. It may also be remarked in general, that the upward concretes denote interrogation, doubt, or what is concessive, conditional, hypothetical; the downward concretes denote what is strong, certain, authoritative, as also wonder, admiration, surprise, and exclamation, when not conjoined with an interrogative meaning.

VI. *The Wave* is a very frequent element of expression, and performs high functions in speech. In its minor forms it is used to give length and emphasis to syllables and dignity to utterance; in its wider intervals it is admirably expressive of irony and derision. Thus the irony of the following passage can be brought out only by the indirect wave of a fifth in both places in which it occurs:—

But it is foolish in us to compare Drusus Africanus and ourselves with Clodius: all our other calamities were tolerable, but no one can patiently bear the death of Clodius.

VII. *The Semitones*.—These are used for the expression of complaint, pity, grief, plaintive supplication, and other sentiments congenial with these. The intonation by the concrete semitone is universally the symbol of nature for animal distress. It affects generally a slow time and long quantity in utterance, and is therefore most commonly heard in the form of the wave. The interjective exclamations of pain, grief, love, and compassion, are prolongations of the tonic elements on this interval; but it may be executed on the short time of immutable syllables, such as *cup*. The appropriate utterance of the following line will exhibit the wave of the semitone on the most important syllables, *poor* and *old* being distinguished by direct unequal waves of the same interval. It must be taken as an isolated line, and not in conjunction with the verse of which it forms part:—

Pi- ty the sor- rows of a poor old man.



VIII. *The Tremor*.—When the tremulous function is made through the second, third, fifth, or octave, or through the wave of these intervals, it joins the sentiment of derision, mirth, joy, or exultation, to that of interrogation, surprise, command, or scorn, conveyed by the smooth concrete of those intervals. In short, it is the introduction into speech of what is transferable in the function of laughter, and it adds thereto all the meaning and force of its satisfaction. Thus

\* Thou art the ruins of the noblest man,  
That ever lived in the tide of times.

There is a sentiment of exultation and a superlativeness of compliment in this eulogy, which cannot be properly expressed by the smooth movement of the concrete; but if the first syllable of the emphatic word *noblest* be uttered with the tremulous intonation of the wave of the third or second, this will give the vocal consummation to the feeling which suggests the exceeding measure of the praise.

The *chuckle* is an example of a somewhat similar application.

When the tremor is formed of a single tonic, in the semitone or its waves, it constitutes the function of crying; and when employed in the syllabic intonation of the chroma-

melody, it sets a more marked distinction on those emphatic words which express the sentiments of tenderness, grief, supplication, and other connatural states of feeling. This may be illustrated on the emphatic syllables of the line just quoted:—'Pity the sorrows,' &c.

IX. The application of the different degrees of *Force* to the purposes of expression is almost too obvious to require illustration. Thus the *distance* of a person spoken to is pictured by loudness, and *nearness* by abatement of force; *secrecy* muffles the voice against discovery, and *doubt* adopts the subterfuge of an undertone. *Certainty* and *anger* assume force and strength. All sentiments which are *unbecoming* or *disgraceful* smother the voice into softer degrees, in the desire to conceal even the voluntary utterance of them. *Joy* is loud, and so are *bodily pain*, *fear*, and *terror*.

Such are some of the uses of force when applied to phrases, or to one or more sentences, in order to distinguish words from adjacent phrases or sentences in discourse. There are other applications of it, to single words, to syllables, and to certain parts of the concrete movement, into which, though of some consequence, it is not within the purport of this article to enter. They will be found described in Dr. Rush's *Philosophy of the Voice*.

The common idea of *Emphasis*, it may be remarked, is that of mere force; but it is more correctly defined to be the expressive but occasional distinction of a syllable, and consequently of the whole word, by one or more of the specific modes of time, quality, force, and pitch. Most of these have been illustrated under the above heads.

X. *Rhythm* is one of the applications of force and quantity. It may be defined to be the metrical arrangement of speech. It is not mainly dependant on custom or on the genius of any language whatever, but arises from the very manner in which speech is produced, and is as involuntary as the throb or remission of the pulse, or the inhaling and respiration of the breath. In the formation of speech there is a regular action and reaction of the organs which produce it. To form a *heavy* syllable, or one which has accentual stress upon it, these organs are necessarily placed in a certain position; and from their very nature it is necessary that, before they form another heavy syllable, they should recover their first position; but the time which is occupied in this recovery of their position is not always lost to the purposes of speech, for it may be filled up with one or more syllables, which have no stress, and which are therefore very properly denominated *light*; if it is not filled up in this way it is a pause or rest. To illustrate this, let us take the words—

One, two, three, four, five.

These monosyllables, if distinctly and deliberately pronounced, have two peculiarities; each has the organic stress or emphasis, and each has a pause after it. Let these pauses be filled up with the light syllable *and*; and then the two lines, viz.:—

One and two and three and four and five and

and

One, two, three, four, five,

will be of exactly the same length as to time in music, or rhythm in speech, the syllable *and* occupying no more time than what necessarily intervenes between the syllables under organic emphasis.

This alternate action and reaction of the organs of speech was called by the Greeks by the significant terms *Thesis* and *Arsis*: the former denoting the *setting down* of a syllable, as the setting down of the foot in walking; the latter denoting the *raising of it up*, like the lifting of the foot from the ground; the former producing the heavy syllables, the latter the light ones.

The weight of syllables, or in other words, the stress with which they are enunciated, must be carefully distinguished from their quantity, since the weight or stress with which the syllable is uttered does not always correspond to the relative time which the utterance requires. Thus in the word *pensive*, the syllable *pen* is the heavier, but it is not longer than the syllable *sive*. So also in the word *inward*, there is an equality of time in the two syllables, but not of weight. In *banish*, *banner*, *banter*, the first syllable is heavy but short; in *paper*, *taper*, *vapour*, it is both heavy and long; and the same observation applies to *misery*, *middle*, *mistress*, compared with *miser*, *minor*, *mitre*.

Those emphatical divisions into which, from the very nature of the organs, all speech naturally falls, are called

by writers on this subject, *cadences*.\* Every full spoken cadence consists of a heavy syllable, and of one or more light ones, but pauses may be substituted to make up the time, which any of these syllables would occupy. Measure, or metre, therefore in speech naturally distributes itself into two kinds: common measure, which, according to Mr. Steele, is the allotment of two crotchets or their equivalents to each cadence; and triple measure, which is the allotment of three crotchets or their equivalents to each cadence; emphasis however will sometimes prolong the duration of a cadence beyond the allotted time, just as an *ad libitum* is allowed in solos in music. Without entering further into minute distinctions or exceptions, the following may serve as specimens of each kind. This mark § indicates a short pause, this || a longer, and this ¶ a still longer one:—

#### Common Measure.

So § | spoke the | guardian § | of the | Trojan | state, |  
Then | rush'd im- | petuous § | through the | Scam | gate; |  
Him | Paris | follow'd § | to the | dire a- | larms: |  
Both § | breathing | slaughter, § | both re- | solv'd is | arm'd |  
Popo's *Zeit.* h. d.

'Straight mine | eye § hath | caught new | pleasures, |  
Whilst the | landscape | round § it | measures, |  
Russet | lawns § and | fallows | grey, |  
Where the | nibbling | flocks § do | stray; |  
Mountains § | on whose | barren | breast |  
The | labouring | clouds § do | often | rest.' |

#### Triple Measure.

'§ At the | close of the | day § when the | hamlet is | still, |  
And | mortals § the | sweets of for- | getfulness | prove: |  
¶ When | nought but the | torrent § is | heard on the | hill, |  
And | nought but the | nightingale's | song § in the | grove.' |

If this system of measuring verse were adopted, to prosody not only of our own but of the learned language would be greatly simplified. The list of feet which usually given at the beginning of the 'Gradus ad Parnassum,' would be reduced to four or five; we should have no such unnatural foot as an iamb or an anapaest, and a syllable at the beginning of an iambic line would either itself form a cadence, or would be the close of a cadence, which a pause or the last syllable of the preceding line would form the commencement. Those lines of Anacreon would then be reduced to the trochaic measure, thus:—

|| Σελ- | ω λε- | γειν 'Α- | τρεδας, |  
|| Σελ- | ω δε | Καδμον | αδειν, |  
§ α | βαρβι- | τος δε | χορδαις |  
|| ε- | ρωτα | μουνον | ηχη. |

From the above examples it is clear that there is a regular rhythmus in poetry; and it cannot be necessary to insist on this being strictly attended to, if we would read verse in an agreeable and expressive manner. Prose also has its rhythmus, for the alternate action and reaction of the organs of speech necessarily proceeds, whether what is spoken be verse or prose; and the only difference (so far as sound is concerned) between these two species of composition is that prose consists of a regular succession of similar cadences, and a limited variety of cadences, divided by grammatical sense and emphasis into proportional clauses, so as to present sensible responses to the ear at regular proportional distances; prose, on the other hand, is composed of all sorts of cadences, arranged without attention to obvious regular proportion, and present no responses to the ear at any definite or determined intervals.

There is nothing which contributes more to the musical flow of prose than giving a light sound to a few syllables. If this be done, they then form the latter part of cadences, of which either pauses, or emphatical monosyllables, or the emphasized syllables of longer words form the beginning; but if they be pronounced heavy, it is then necessary that they should themselves form the beginning of new cadences, which is the occasion of many pauses being introduced, and of a heavy and halting character being communicated to the piece. Thus the clause 'Let your heart be troubled,' will be rhythmical if you thus made a light syllable; but the effect will be quite different if it be read thus:—'Let not | your § | heart be troubled.' |

Of the advantage of cadences in triple measure we have a beautiful illustration in the first verse of the 118 Psalm:—

'O | give || | thanks unto the | Lord; || | for he is | good, § | for his en- | dureth for | ever.' § |

\* More properly *rhythmical cadences*, to distinguish them from the cadence of melody. Mr. Cull would prefer the term *measures*.

On the other hand, a succession of heavy syllables, with a pause intervening, is one of the most expressive forms of emphasis both in prose and verse. Thus the following line from Milton would lose all its force, if read so as to form only the usual number of six cadences: emphasis prolongs it to eight, thus:—

\* Rocks, | | caves, | | lakes, | | fens, | | bogs, | | dens and | shades of | death.' | |

Independently of its agreeable effect upon the ear, and its power as an element of expression, there can be no doubt that, as rhythm arises from the very manner in which speech is produced by the organs, he who speaks agreeably to its laws will speak easily to himself. The practice of reading or speaking aloud, with a due attention to the rhythmus, may even be recommended as a means of improving the health, since it brings into regular and natural action the muscles of the face, the throat, and the chest; and no attempt completely and permanently to remove impediments of speech can be successful, which is not based on the principle here developed.

(A succinct account of rhythm will be found in Wood's *Grammar of Elocution*, ch. iv. and v.; and the subject is treated much more at length in Steele's *Prosodia Rationalis*; in Thelwall's *Illustrations of English Rhythmus*; in Roe's *Principles of Rhythm*; and in Chapman's *Music, Melody, and Rhythmus of the English Language*, 8vo, Edinburgh, 1819; as well as in his *Rhythmical Grammar*, 12mo, 1821.)

**Method of Training and Strengthening the Voice.**—In order to read and speak well, it is necessary to have all the vocal elements under complete command, so that they may be duly applied whenever they are required for the vivid and elegant delineation of the sense and sentiment of discourse. The student therefore should first practise on the thirty-five alphabetic elements, in order to ensure a true and easy execution of their unmixed sounds. This will be of more use than pronouncing words in which they occur; for when pronounced singly, the elements will receive a concentration of the organic effort, which will give them a clearness of sound and a definite outline, if we may so speak, at their extremes, making a fine preparation for their distinct and forcible pronunciation in the compounds of speech. He should then take one or more of the tonic elements, and carry it through all the degrees of the diatonic and concrete scales, both in an upward and a downward direction, and through the principal forms of the wave. He should next take some one familiar sentence, and practise upon it with every variety of intonation of which it will admit. He should afterwards run through the phrases of melody, and the forms of the cadence; and lastly he should recite, with all the force that he can command, some passage which requires great exertion of the voice. If he would acquire power and volume of utterance, he must practise in the open air, with his face to the wind, his body perfectly erect, his chest expanded, his tongue retracted and depressed, and the cavity of his mouth as much as possible enlarged; and it is almost unnecessary to add that anything which improves the general tone of the health will proportionably affect the voice. If to this elementary practice the student add a careful and discriminating analysis of some of the best pieces which our language contains, both in prose and verse, and if he strenuously endeavour to apply to them all the scientific principles which he has learned, there can be no doubt that he will acquire a manner of delivery, which will do ample justice to any subject on which he may be called to exercise his vocal powers.

Intimately connected with the subject of delivery is that of *Action*. Oratorical action has been defined to be the just and elegant adaptation of every part of the body to the nature and import of the subject on which we are speaking. As every man who feels his subject will necessarily have some action, it is of consequence that it should be graceful and significant. The first point to be attained is to avoid awkward habits, such as resting the chief weight of the body first on one foot and then on the other, swinging to and fro, jerking forward the upper part of the body on every emphatic word, keeping the elbows pinioned to the sides, and sawing the air with one hand with one unvaried and ungraceful motion. As for the attainment of excellences, more specific rules must be sought for in professed treatises on the subject, but the following general directions will be found to embrace much that is useful: 'Keep the trunk of the body erect; let your hands be at liberty; feel

your subject, and the action will come; recollecting at the same time that the right hand is essentially the instrument of action, and that the left should be used only as subordinate to it.'

As gesture is used for the illustration and enforcement of language, so it should be limited in its application to such words and passages as admit of or require it. A judicious speaker will not only adapt the general style and manner of his action to the subject, the place, and the occasion, but even when he allows himself the greatest latitude, he will reserve his gesture, or at least the force and ornament of it, for those parts of his discourse for which he also reserves his boldest thoughts and his most brilliant expressions.

(On the subject of *action* very minute directions will be found in Austin's *Chironomia*, London, 4to., 1806; see also Chapman's *Musie of the English Language*, p. 112; and Walker's *Elements of Elocution*.)

**ORB, ORBIT.** The word *orbis* signifies the circumference of a circle or of any round body; *orbs* among the ancient astronomers meant the vast crystal spheres in which the heavenly bodies were supposed to be placed and with which they revolved; hence *orb* came to be used for a sphere, as when the sun is called the *orb of day*. The word *orbit* now means the relative path [MOTION] in which a planet travels round the sun or a satellite round its primary.

We should perhaps rather say that by the orbit of a planet, technically speaking, is meant the approximate path, circular or elliptic, in which the planet may for a time be supposed to move without sensible error. Thus when for some particular purpose, as the explanation of the seasons, we say the earth moves round the sun in a circle, we make an orbit which is exact enough for that purpose; and when, to explain the equation of time, we are obliged to have recourse to a more exact supposition, that of an elliptic motion, we are still said to speak of an orbit of the earth. But if we were to speak of the closely-folded interlacing spiral in which the centre of the earth actually moves round the sun, usage (and nothing else) would require us, if we would be understood, not to call this the orbit of the earth, but its real path, or real orbit, or some such distinctive term; for it is generally understood that the word orbit applies at most to the ellipse, which for a time does not differ sensibly from the real path. Theoretically speaking, this ellipse only touches the real path in one point; and the ellipse which most exactly tends to coincidence with the real path, consistently with satisfying other desirable conditions, is called the instantaneous ellipse. [GRAVITATION, vol. xi., p. 364.]

The *elements* of the orbit are those quantities by which the position and magnitude of the (*pro tempore*) orbit are fixed, such as the major axis and eccentricity, which determine its magnitude; the longitude of the node and inclination of its plane to the ecliptic, which determine the position of that plane in space; and the longitude of the perihelion, which determines the direction of the major axis. One more determining quantity is tacitly supplied in the condition that one focus of the ellipse is always to be in the centre of the sun. The only remaining element is the periodic time of the planet, or its time of revolution round the sun; this however is not a separate element for each planet, but, all the other elements being given, is known for every planet when it is known for any one.

**ORBITELLO.** [SIENA, PROVINCE OF.]

**ORBITOLITES.** [MILLEPORIDÆ.]

**ORCANNETTIN**, the colouring matter of alkanet root (*orcanette*, *lithospermum tinctorium*). It was extracted from the root by Pelletier, in 1814. It is procured by treating it with æther, and evaporating the solution. This substance has a resinous appearance, is fusible at 140° Fahr., and is of so deep a colour as to appear black. Water dissolves a mere trace of it, but alcohol and æther become of a red colour by dissolving it, and liquefied fatty substances are also coloured by it. Acetic acid and the alkalis dissolve it, the latter forming blue solutions; acetate of lead precipitates it blue, chloride of tin crimson, and the salts of iron and of alumina of a violet colour.

**ORCHARD.** Apples, pears, and cherries are the fruits principally cultivated in orchards. The term orchard is likewise used to signify enclosures in which filberts or walnuts are grown: the word yard is commonly used for similar spaces appropriated to the production of figs and grapes.

Orchards of apples and pears are more numerous, because more productive, on the old and new red-sandstone form



tions than on any other strata; a very large proportion of all the cider and perry that is manufactured is grown upon these soils. The principal orchards of England are in Devonshire, Somersetshire, Gloucester, Herefordshire, and Worcestershire; on the continent, in Normandy and in the vale of Stuttgart; and in America, in the New England states.

For an orchard of apple-trees, a deep unctuous soil should be selected, in a situation sheltered from the north and north-west winds, and open to the south and south-east; and a bank is preferable to a low spot, for not only is the blossom more liable to be injured by spring frosts where fogs and damp prevail, but the trees themselves become mossy, and perish from excess of moisture. Dr. Lindley (*Guide to Orchard and Kitchen Garden*, p. 117) recommends an early and effectual preparation of the soil, and the early transplanting of the trees: 'They cannot be removed from the nursery too soon after the wood has become ripe and the leaves have fallen off; for between this time and the winter many of them will make fresh roots, and be prepared to push forth their young shoots with more vigour in the spring than those whose transplanting has been deferred till a late period of the season.' Young trees will require to be watered if a dry spring should succeed the autumn of their planting, and their roots should be occasionally dug round and manured. Pruning is advantageous to young trees when skillfully performed, for it is desirable that branches should not be crowded together, especially in the centre of the tree: we are of opinion that it is seldom beneficial to old trees, excepting for the removal of mistletoe; and recommend that under no circumstances should a pruner be employed who amputates large limbs and leaves wounds which injure the alburnum or sap-wood by exposing it to the atmosphere, and produce canker in the stem or principal branches. It may frequently be useful in an exposed situation to plant two or three rows of pear-trees to shelter the apple-trees from the prevailing storms, as pear-trees are on the whole less liable to suffer from wind than their more brittle kindred. The trampling of heavy cattle is at all times injurious to orchards.

For pear-orchards a lighter soil is desirable than for apples; the same rules may be observed for their planting and preservation. Washes for the destruction of the eggs of insects, and the preservation of orchard-trees from barking by hares, rabbits, and sheep, may be seen in Lindley, ut sup. 509; Forsyth *On Fruit Trees*, p. 333; Loudon's *Arboretum*, vol. ii., 903, &c.; for further information see articles APPLE, CIDER, and PEAR.

The principal cherry-orchards in England are in Buckinghamshire and Kent; from the latter county a large supply is sent to the London markets. In Alsace, Württemberg, Berne, and Basle, 'kirschwasser,' an ordinary spirit, is distilled from cherries. There are likewise orchards of a small acid cherry called 'marasca' in the neighbourhood of Trieste, and also near Zara in Dalmatia, from which Maraschino is derived: in the Bergstrasse, near Heidelberg, there are cherry-orchards which furnish an early supply to the London market.

For filbert and walnut orchards see FILBERT and WALNUT. (Forsyth *On Fruit Trees*; Lindley's *Guide to the Orchard and Kitchen Garden*; *A Treatise on the Culture of the Apple and Pear*, by T. A. Knight, Esq.; Marshall's *Rural Economy of the West of England*, vol. i., p. 213; Loudon's *Arboretum*; Kenrick's *American Orchardist*.)

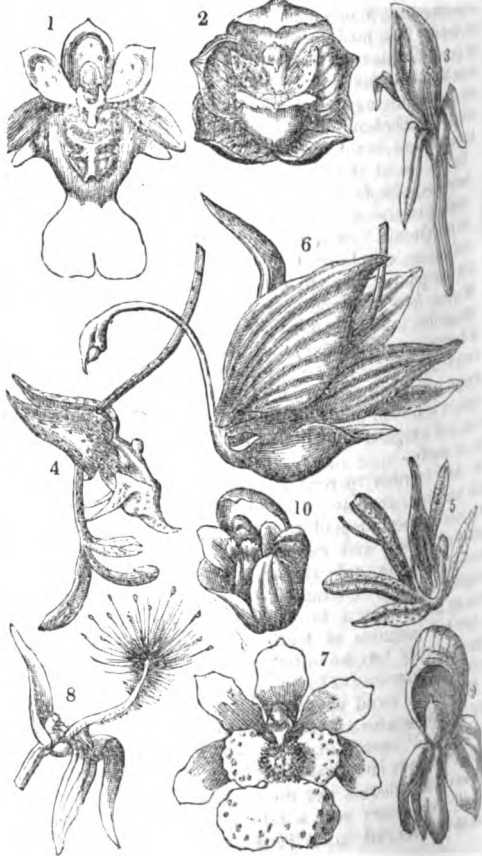
ORCHESTRA (Gr. ὀρχήστρα, which contains the same element as the verb ὀρχήσθαι, to dance), that part of the Greek theatre in which the chorus was situated—where the dances were performed. With the moderns, the Orchestra is the place in the theatre allotted to the instrumental band, and that portion of a concert-room which is assigned to the musical performers, both instrumental and vocal. We not only apply the word to the place set apart for the musicians, but often use it to designate the whole of them collectively; in which case, *orchestra* and *band* are treated as synonymous terms.

Till the end of the seventeenth century, or the beginning of the last, the instrumental performers of our theatres were stationed in a box on the side of the stage, and out of view of the greater portion of the spectators. They were then few in number. But, however desirable in some respects, it would be impossible so to dispose of the large bands of the present day; and all things considered, they could not be better placed than where they now are—just below the

stage, so as not to interrupt the sight, and between the singer and the audience, thus enabling the former to have in view the conductor and leader, a matter of great importance in the musical drama, where all is sung by memory.

The Orchestra of a concert-room should be so contrived that the front, when no passage beneath it is required, is about five feet higher than the level of the room, and should rise, rather steeply, to the back, the corners of which ought to be rounded off, in order that the whole body of sound may be directly reflected. Had this precaution been attended to in building the Hanover-square Concert-room, the orchestra would, for its size, want nothing to render it perfect. An orchestra may be too wide, which is the fault, be not an irremediable one, of Exeter Hall, in the Strand: the distance in that room from one side to the other is so great that the various sounds do not blend with the required nicety: and, extraordinary as the fact may appear, that a delicate and experienced ear, a perceptible interval of time elapses before the sound produced on one side is heard on the other.

ORCHIDA'CEÆ are Endogenous plants, with the stems and style consolidated into a central column, and an inferior ovary; they constitute the whole of the *Gynandria Monandria* of the Linnean classification. There is no order of plants the structure of whose flowers is so anomalous, as regards the relation borne to each of the parts of reproduction, or so singular in respect to the form of the floral envelopes, of which an illustration has already been given in the article ONCIDIUM. Unlike other endogenous plants, the calyx and corolla are not similar to each other in form, texture, and colour; neither do they any similitude to the changes of outline that are met with in such irregular flowers as are produced in other parts of the vegetable creation. On the contrary, by an excessive development, and singular conformation, of one of the petals called the *labellum*, or lip, and by irregularities either in form, size, or direction of the other sepals and petals, the peculiar adhesion of these parts to each other, and the occasional suppression of a portion of them, flowers are produced so grotesque in form that it is no longer within the power of the human mind to search for resemblances in the animal world. Hence we have such names among our native plants as the *fly*, *man*, *lizard*, and *butterfly orchis*, and appellations of



the like nature in foreign countries. Of these things some idea may be formed by the following cut, where 1 represents *Oncidium raniferum*, or the Frog *Oncidium*, so called because its lip bears at its base the figure of a frog couchant; 2, *Peristeria elata*, the Spirito Santo or Holy Ghost plant of Panama, in whose flower we find the likeness of a dove in the act of descending upon the lip; 3, *Prescottia colorans*, whose lip is a fleshy hood; 4, *Gongora fulva*; 5, *Cirrhaea tristis*; 6, *Cynoches ventricosum*, singularly like a swan, the arched column forming the head and neck; 7, *Oncidium pulvinatum*; 8, *Bolbophyllum barbigerrum*; 9, *Catasetum viride*; and 10, *Peristeria cerina*.

In consequence of their singular forms, their gay colours, and the delicious fragrance of many of these plants, they have of late years been cultivated with great zeal, both in this country and abroad, as has been stated in a former article [EPIPHYTES], to which we refer for information concerning their natural habits. In this place we proceed to give such a technical account of the structure of the order as will enable the reader to understand the principles of their classification, and to reconcile their structure, irregular as it is, with regular types observable in other parts of the vegetable kingdom.

Orchidaceous plants inhabit all parts of the world, except those which are excessively dry or excessively cold, both of which appear uncongenial to their nature, and they are most abundant in such as have an equable mild climate, moist and warm during the greater part of the year. Thus we have not a single species from Melville Island, or Nova Zembla, or from the upper regions of northern mountains, nor from the deserts of Africa; and the whole province of Mendoza, one of the dry western states of South America, produces but one, and that in a marsh. On the contrary, the woods of Brazil and equatorial America, of the lower ranges of the Himalayas, and of the Indian Archipelago, possess countless myriads of these productions. In general in hot countries the species are epiphytes, inhabiting the branches of trees, or the sides of rocks and stones, to which they cling by means of long twisting fleshy roots; and terrestrial species, that is to say, such as grow exclusively in the ground, are rare and unknown: in colder countries, on the contrary, the former are unknown and the latter only represent the order. Thus in North America, where Orchidaceous plants are plentiful, the epiphytal species are almost unknown, a single species only occurring in Florida upon the branches of the Magnolia. Some of them are true parasites, deriving their food from the roots of trees upon which they grow. In this country we have two cases of the kind, one the *Neottia Nidus avis*, or bird's-nest Orchis, a brownish scaly plant springing up occasionally in woods, and the other the *Corallorhiza innata*, or coral root, an occasional but very uncommon inhabitant of marshes.

The roots are of the following kinds:—Firstly, annual slender fibres, simple or branched, of a succulent nature, incapable of extension, and burrowing under ground, as in the genus *Orchis*. Secondly, annual fleshy tubercles, round or oblong, simple or divided, as in the various species of the same genus; they are always combined with the first, and appear, from their containing amylaceous granules in large quantity, to be intended as receptacles of matter fit for the nutrition of the plant. Tubercles of this kind have always a bud at their extremity, and may be considered the principal inferior prolongation of the axis. Thirdly, fleshy, simple, or branched perennial bodies, much entangled, tortuous, and irregular in form, as in *Corallorhiza*, *Neottia*, &c., or nearly simple and resembling tubers, as in *Gastrodia*. And fourthly, perennial round shoots, simple or a little branched, capable of extension, protruded from the stem into the air, adapted to adhering to other bodies, and formed of a woody and vascular axis covered with cellular tissue, of which the subcutaneous layer is often green and composed of large reticulated cells. The points of these roots are usually green, but sometimes red or yellow. In a very few instances of leafless species, as *Chiloschista usneoides*, they become entirely green, and then appear to perform the functions of leaves.

The stem is found in its most simple state in the terrestrial *Ophrydæ*, where it is only a growing point, surrounded by scales and constituting a leaf-bud when at rest, which eventually grows into a secondary stem or branch, on which the leaves and flowers are developed. This kind of stem usually forms every year a lateral bud with a tubercular root at its lower end, and, having unfolded its flowers and

ripened its fruit, perishes, to be succeeded by the stem belonging to the lateral bud previously prepared; hence those species to which this kind of stem belongs have always a pair of tubercles, one shrivelling and in progress of exhaustion, the other swelling and in progress of completion. It is sometimes found that the successive formation and destruction of annual tubercles takes place beneath an equal number of skins, the new bud and tubercular root being always formed within the axil of a scale-like coating belonging to the parent; this takes place in the genus *Thelymitra* and elsewhere. Sometimes such a stem, instead of forming a new bud upon its side, pushes out a slender subterranean root-like runner, which, after growing to some length, is arrested in its growth, and then forms at its extremity a new bud, which lengthens at its base into a tubercle. In such instances as this, a kind of locomotion may be correctly said to take place, the plant shifting its place yearly, and to such a distance as may be determined by the length of the runner, which separates the parent plant that perishes from the young offspring that is generated. Instances of this are common in terrestrial genera. A modification of it is when the tubercles are buried deep under ground, and always emit a root-like stem upwards, which produces true roots until it reaches the light, and then only develops leaves. This occurs in *Corysanthes* and elsewhere. In other cases the growing point becomes perennial, thickens, is scarred with the remains of leaves which once grew upon it, and assumes the state of a short, round, or ovate perennial stem or pseudo-bulb. In such a case it commonly emits from its base a shoot, which creeps along the ground, or over the surface of a branch, if the species is an epiphyte, and becomes a woody rhizoma, covered with scales which represent undeveloped leaves; after having advanced to a length which varies in different species, the rhizoma ceases to grow, and forms a new pseudo-bulb at its end. The latter subsequently protrudes a new horizontal rhizoma, which again terminates in a pseudo-bulb, and thus by degrees large masses of pseudo-bulbs are formed by a single individual, and literally pave the place upon which they grow. Such pseudo-bulbs are entirely analogous to the scaly bud found upon the end of the tubercular root of an *Ophrydea*; and the rhizoma in like manner is of the same nature as the runner that connects the old tubercle with the new one in such a plant; but pseudo-bulbs, in consequence of their perennial nature, are more completely formed, often have a woody texture, generally a hard epidermis, assume various angular or other figures, and develop a definite number of leaves from their points. This is the common mode of growth of the genera *Maxillaria*, *Stanhopea*, and many others. Pseudo-bulbs of this kind are always composed of cellular tissue, containing a great quantity of mucilage (and amylaceous granules) traversed by simple fibro-vascular cords, and hollowed into an infinite number of minute chambers. In other cases the rhizoma, instead of having pseudo-bulbs, forms short stems which are terminated by one or more leaves, as in *Pleurothallis* and its allies, and in the genus *Cattleya* and others; these differ from the pseudo-bulbous species only in the thickness and form of their axis. The formation of tubercles and terminal buds, or of creeping rhizomata and pseudo-bulbs, is the most common tendency of the order, but not the only one; in *Eulophia*, *Bletia*, and others, the rhizoma assumes simply the form of an ordinary tuber; and in *Vanilla*, *Dendrobium*, *Vanda*, and others of a similar nature, there is no rhizoma, but the stem lengthens as in common plants, from which there is nothing to distinguish it; some of the species of *Dendrobium* are remarkable for having the pseudo-bulbous form at one end of their stem, and the common state at the other, as *D. crumenatum*, &c. When such plants as *Dendrobium Pierardi* grow very fast, in an atmosphere which suits them, their stems will frequently branch, when the new branches throw out roots in abundance from their base; in such cases the original branches are equivalent to the rhizoma of the pseudo-bulbous species, and the secondary branches to the pseudo-bulbs themselves.

The leaves are very uncertain in their appearance: usually they are sheathing at the base, and membranous; but in *Vanilleæ* they are hard, stalked, articulated with the stem, and have no trace of a sheath. Frequently they are leathery and veinless, as frequently they are membranous and strongly ribbed, and both these conditions occur in the same genus, as in *Maxillaria* and *Cypripedium*. In a large number of the epiphytal species the leaves are notched or

equally at the apex, a singular structure which has not yet been noticed in those with membranous leaves.

Their floral envelopes are constructed irregularly upon a ternary type, and consist of three exterior and three interior pieces. The exterior pieces are usually nearly equal, and less brightly coloured than the interior; but the two lateral ones are often of a somewhat different form from the other, which is anterior as the flower is placed upon the inflorescence when young, but which often becomes posterior when the flower is expanded, in consequence of the flower-stalk being twisted or curved: these parts are occasionally united by their edges into a long tube, as in *Masdevallia*, or the lateral ones adhere to the unguis of the lip in various degrees, or two of them are consolidated into one, as in *Corycium* and many other genera. Occasionally the intermediate piece is prolonged at the back or base into one or two hollow spurs, as in the genera *Satyrion* and *Disa*; still more rarely the lateral pieces are also spurred, as in *Disperis*. Various other less important modifications of the exterior pieces occur, but in all cases the whole number, three, is present. The interior pieces are usually three, never more; but in the instances of *Monomeria* and *Aviceps*, the intermediate one only is present. They are generally unequal, the two lateral pieces corresponding in form and size, while that between them, called the lip, is of some other form and size: in the genus *Thelymitra* however, and in *Paxtonia*, they are all alike. Nothing can be more variable than the proportions they bear to each other and to the exterior pieces. It is only a few of their modifications which it seems important to notice. The lateral pieces are occasionally bifid, as in certain species of *Habenaria*: in *Megacelinium falcatum* they are glandular at the apex: in most cases they are distinct from the column; but in *Lepanthes*, *Gongora*, *Disa*, and some others, they are adnate to that organ: in no instance are they spurred or saccate. The lip is either distinct from the column or united to it, stalked at its base, or dilated there, and often extended into a bag or spur, which is sometimes, as in certain species of the genus *Epidendrum*, consolidated with the ovary: very rarely it has two spurs, as in *Diplocentrum*. In the instances of *Camarotis* and *Acropera* it is saccate at the point. Its form is infinitely varied, the extremes of variation being *Paxtonia* for simplicity, and *Coryanthes* or *Stanhopea* for complexity: these and all other complicated forms may, without difficulty, be reduced to a three-lobed type, the simple form of which is found in *Maxillaria*, *Bletia*, and many *Cattleyas*. The lip is often so slightly articulated with the column as to swing to and fro upon the least disturbance, on which account it sometimes seems as if it were endowed with a power of spontaneous motion: this is particularly apparent in certain species of *Pterostylis*. There is a frequent tendency in the lip to produce tubercles or lamellæ upon its surface; the latter are always confined to the veins, the former are principally found near the base of the lip, and do not appear to have any relation to the veins: it is in the genus *Oncidium*, *Eria*, and *Zygopetalum* that these bodies, the use of which is unknown, are most conspicuous. Not unfrequently the lip is hairy, convex, and so marked and coloured as to bear no little resemblance to an insect.

It is usual to call the exterior series of floral envelopes calyx, and the interior corolla; but the analogy of *Marantaceæ* renders it probable that the so-called petals are a row of outer sterile stamens. This however is a point upon which it is not here necessary to enlarge.

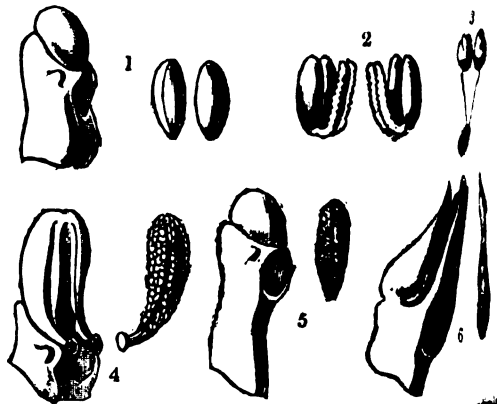
The centre of the flower is occupied by a body called the column, which is formed by the consolidation of the style and true stamens. In the greater part of the order there is but one stamen present, and it is in that case placed opposite the intermediate sepal, and consequently alternate with the lateral petals; when, as in *Cypripedium*, there are two stamens present, then the usual stamen remains in its customary position, in a sterile state; and the two perfect stamens are additional, and placed right and left of it. It is supposed that in those species which have but one anther there are two other stamens present in an incomplete condition, and consolidated with the other; and from the evidence offered by monstrous formations, it is thought that such sterile stamens are represented in *Orchis* and its allies by two tubercles, one on each side of the column; in *Burlingtonia* by two auricles near the apex of the column, and by other signs in other cases. Some objections have however been taken to this, but they do not appear of sufficient moment to require particular discussion. The reader who

is anxious for information as to this and several other points of a similar kind, is referred to the prefatory remarks the writer of this article in Bauer's 'Illustrations of Orchidaceous Plants,' 4to., London, 1830; 1838, with forty plates in 4to.

In the greater part of the order a single anther terminates the column. This is usually two-celled, but often has cells divided into two or four other cavities, by the extension of the endothecium between the lobes of the pollen mass or is occasionally more or less completely one-celled by absorption of the connective. In *Ophrydæ* it is erect with a distinct connective, and with the bases of the cells either parallel or diverging, and then its cells dehiscence at their face. In *Neottia* it is also erect, but appears to be dorsal instead of terminal, in consequence of the style being placed before it for its whole length. In the remainder of the order it falls prone upon the head of the column or the clinandrium, like a lid, and often is easily detached, sometimes this kind of anther originates from the margin of the clinandrium; sometimes from within the margin, in which case it is occasionally covered as by a hood, as in *Cryptarrhena* and other genera.

The pollen consists of lenticular or spheroidal grains, either single or cohering in pairs, threes, or fours, or in larger masses in indefinite number. The grains are usually held together by an elastic filamentous substance, which in *Ophrydæ* and many others forms an axis round which the grains or masses of grains are arranged, and which in a very large part of the order assumes the appearance of a short caudicula. This body either contracts an adhesion with a gland originating on the margin of the stigma, as in *Ophrydæ*, *Neottia*, and *Vanda*, or it is folded upon the pollen masses, as in *Epidendrum*, or it terminates in an apophyseous dilatation, as in many *Malaxidæ*. In all cases it consists of cellular tissue, sometimes very lax and large, and thin-sided, as in *Polystachya ramulosa*, more generally very compact, tough, and thick-sided; towards the end which adheres to the stigmatic gland the tissue becomes elongated, but otherwise it is more or less lenticular. In *Ophrydæ* the caudicula is extended towards the base of the anther-cells; but in all the other divisions of the order the caudicula, when present, is lengthened in the direction of the apex of the cells.

The differences in the structure of the column, anther, and pollen now explained, furnish botanists with the best means of classifying the order and of breaking it up into sub-orders, in the following manner:—



1. *Malaxidæ* (fig. 1), anther opercular; pollen waxy, with neither caudicula nor gland.
2. *Epidendrum* (fig. 2), anther opercular; pollen waxy, with the caudicula folded back upon the pollen grains, and no gland.
3. *Vanda* (fig. 3), anther opercular; pollen waxy, with a membranaceous lacinious caudicula and gland.
4. *Ophrydæ* (fig. 4), anther erect; pollen sec'de or granular.
5. *Arethusa* (fig. 5), anther opercular; pollen granular or powdery.
6. *Neottia* (fig. 6), anther dorsal; pollen powdery.
7. *Cypripedium*, anthers two, separated by a broad sterile lobe.

The ovary adheres firmly to the tube of the calyx, and is often so twisted, when the flower is about to expand, that it is turned back, with the floral envelopes belonging to it, is turned to the front. It consists of three perfect carpels, stationed alternately with the stamens opposite the petals, and bearing the placentæ in their axis, and of three other pieces alternate with the first, destitute of placentæ, and eventually separating from them when the fruit is ripe.

The stigma is a viscid excavation in front of the anther,

and just below it. In most cases it is quite simple, merely terminating in a glandular dilatation of the upper margin, called the rostellum. It is lined with a lax tissue composed of minute ascending jointed hairs, and has a direct communication with the cavity of the ovary, either open or only imperfectly closed up. The glandular dilatation in all *Vandæ* and *Ophrydæ*, and in many genera, separates from the stigma and adheres to the pollen masses, but it is also in numerous other genera at all times inseparable from it. In *Bonatea*, in *Habenaria*, and in some other genera of *Ophrydæ*, there are two arms to the upper edge of the stigma, each arm being channelled for the reception of the caudicula of a pollen-mass, and terminating in a separable gland; between these lies a membrane, very variable in size, sometimes merely a connecting web, sometimes a distinct plicature or lobe, and occasionally fornicate and extended in the middle into a mucro.

The fruit is usually a capsule of six valves, bursting when ripe, and discharging a multitude of minute seeds, with a netted loose tonic. In *Vanilla* however and some other genera the fruit is succulent, and the seeds have a hard brittle integument immersed in aromatic pulp. The seeds apparently contain an exalbuminous embryo; but from the great minuteness of the parts this point is not yet satisfactorily determined.

Impregnation in *Orchidaceæ* was at one time thought to take place in a peculiar manner, by intersusception of the fertilising principle of the pollen grains. It has now however been proved experimentally by Brown, A. Brongniart, Morren, and the writer of this article, that it in reality takes place only by the application of pollen grains to the mucous surface of the stigma, as in other plants.

Those who are desirous of further acquaintance with this singular order should consult Bauer's *Illustrations*, above quoted; R. Brown's *Prodromus Floræ N. Hollandiæ*, 8vo., 1810; the same author's *Observations upon the Impregnation of Orchidæ and Asclepiadæ*, 8vo., London, 1831; Lindley's *Genera and Species of Orchidaceous Plants*, 8vo., London 1830-40, still in course of publication; and Endlicher's *Genera Plantarum*, p. 185, 4to., Vienna, 1836-40, still publishing.

ORCHIL, or ORCHELLA, also written *Archil*, is the name of a dye as well as of the plant (one of the humble tribe of Lichens, or Rock-Moss) which yields it. The name is derived from the *Oricello* of the Italians or the Spanish *Orchella*. It is often corrupted in commerce into *Rochilla* weed. Several kinds are employed for the same purpose, which are distinguished according to the country from whence they are imported, and also by manufacturers into *weed* and *moss*, the former name being applied to the filiform lichens of botanists belonging to the genus *Roccella*, to be treated of here, while the terms *moss* and *rock-moss* are applied to the crustaceous lichens belonging to the genus *Lecanora*, which include the Cudbear and *Pareille* of dyers. [PARELLA.] Tournesfort is of opinion that this dye was known to the ancients, and that it was the *λεγχνη* of Dioscorides; this of course it is difficult to prove, but it is remarkable that the Arabian authors give *abryon* (an *βρυον*?) as the Greek synonym of a lichen which is in India used as a dye. Tournesfort further thought that this was the substance used in dyeing the purple of *Amorgos*, one of the Cyclades, and says that when he was in the island, the lichen was still collected, and sold for ten crowns the hundredweight, to be sent to England.

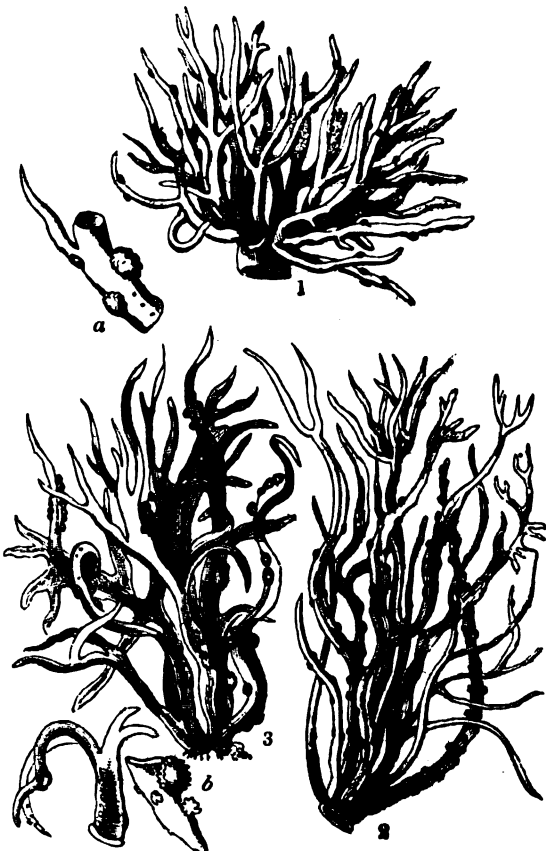
The mode of preparing the dye was however lost, until rediscovered by a Florentine, who realised a large fortune, and kept the process secret. The manufacture was retained for a century in Italy, and the weed was collected on the shores of the Mediterranean and those of its islands. It was however called tincture of *turnsole*. The Dutch afterwards carried on the manufacture, and called it *lacmus* or *litmus*; but it has for some time been extensively carried on in England and Scotland, as is evident from 1813 cwts. having been imported in 1829, though the quantities of good kinds have since diminished, from the difficulty of procuring them, as the price has continued to rise, and many parts of the world have been searched for species fit for the use of the dyer. That imported from the Canaries sells for 250*l.* to 350*l.* a ton; Cape de Verde weed, as high as 300*l.*; the Azores or Western Island weed, 230*l.*; Madeira, 150*l.*; Africa, 120*l.*; South America, 120*l.*; Cape of Good Hope, 20*l.*; while some has recently been brought from the East Indies, where both kinds are found, and one of them very abundantly.

This great difference of price is owing to different kinds being collected; some kinds, as the Canary weed, *Roccella tinctoria*, abound in colour; while others, as the *R. fuciformis*, contain it in much smaller proportion. These species resemble each other a good deal, and therefore the difficulty is great of collecting the good kind. Sir W. J. Hooker has given as the character of the genus *Roccella*,—Thallus coriaceous-cartilaginous, rounded or plane, branched or lacinated; apothecia orbicular, adnate with the thallus; the disk coloured, plano-convex, with a border at length thickened and elevated, formed of the thallus, and covering a sublentiform, black, compact, pulverulent powder, concealed within the substance of the thallus.

*R. tinctoria* (Dyers' Roccella, or Orchil): thallus suffruticose, rounded, branched, somewhat erect, greyish-brown, bearing powdery warts; apothecia flat and horny, with a scarcely prominent border. A practical writer describes 'the good kind as having a nearly white powder on its surface towards the centre; the under surface is of a grey colour, and is not hairy; if wetted, it does not turn of an orange colour; its edges are flat and thin.'

*R. fuciformis* (flat-leaved Orchil): thallus flat, branched, nearly upright, greyish-white, bearing powdery warts; apothecia horny, bordered.

Both kinds are found on maritime rocks, as well on the coast of England as those of the places already indicated, or on dry stone walls, exposed to the influence of the sea-breeze; the more arid the situation, the better is the quality of the lichens. The presence of the colouring matter is ascertained by steeping the weed broken up in small pieces in diluted solution of ammonia, in a bottle half filled with liquid, which should be kept corked, but frequently opened in a temperature not exceeding 150° Fahr. Orchil forms a rich purple dye, which, though fugitive, is considered indispensable by the dyers, because it greatly improves the brilliancy of some of the colours, and gives the peculiar lustre and purple tint to some of the English broad-cloths in consequence of their being first dyed with orchil. [ARCHIL.] ('Proceed. Com. Asiatic Soc.,' April, 1837; also Thomson's 'Chemistry of Organic Bodies—Vegetables,' where a full account is given of several chemical analyses of dye-yielding lichens, p. 399.)



1, *Roccella tinctoria*; a, warts on the thallus.  
2, *Roccella tinctoria* (East India).  
3, *Roccella fuciformis*; b, apothecia.

**ORCHO'MENUS**, called the 'Minyeon,' and afterwards 'the Bœotian,' was a city on the western shore of the Lake Copais, in Bœotia. In the earliest period of Grecian history it was known as a place of great power and wealth. (Homer, *Iliad*, ix. 381.) Its antient magnificence is attested by the treasury of Minyas in it, which is described by Pausanias as being equal to any similar building which he had seen, and by the subterranean outlets of the Lake Copais, the remains of which exist to this day. [Bœotia, vol. v., p. 43.] In the earliest times Orchomenus was the chief city of the Minyans, to whom the greater part of Bœotia, including Thebes itself, was subject. The history of this people is very obscure. Andreus, the first king of Orchomenus, is called the son of the river Peneus in Thessaly. In Thessaly moreover we find Minyans, with a city Orchomenus. Minyas is also made a descendant of Æolus. Mr. Thirlwall says that the early legends about the Minyans 'may be considered as indications of a native race, apparently Pelasgians, overpowered by Æolian invaders; and the same fact seems still more clearly attested by the names of the two Orchomenian tribes, the Eteoclean and the Cephisian; the former of which, called after Eteocles, the son of Andreus, seems to have comprised the warlike chiefs; the latter, the industrious people which tilled the plains watered by the Cephisus.' (*History of Greece*, vol. i., p. 93.) From the heroes of the Argonautic expedition being called Minyans, and from other circumstances, it has been thought that the name was not originally that of a nation, but was used as a title of honour equivalent to heroes or warriors, and was afterwards appropriated to the Æolians who established themselves at Iolcus and on the adjacent coast. (*Ibid.*, p. 91.) In the sixtieth year after the Trojan war, the Æolian Bœotians, who had been expelled from Thessaly, drove out the Minyans from Orchomenus, which was then with its territory added to Bœotia. (Thucyd., i. 12; Strabo, ix., p. 401.)

At and shortly before the time of the Peloponnesian war, we find Orchomenus as one of the most powerful states of the Bœotian confederacy, and having under it the towns of Chæronea and Tegyra. Its government was oligarchical: the ruling order was called 'knights.' (Diod. Sic., xv. 79.) When Thebes was feeble, and Bœotia was subject to Athens (about B.C. 447), Orchomenus was a refuge for the oligarchical exiles of the neighbourhood. (Thucyd., i. 113.) After the peace of Antalcidas (B.C. 387), by which the Bœotian cities were freed from the supremacy of Thebes, Orchomenus was confederate with Sparta, and had in it a Lacedæmonian garrison. (Plutarch, *Pelop.*, 16.) In the year 368 B.C., the Thebans, taking advantage of the absence of Epaminondas on an expedition, destroyed Orchomenus, slaying the men, and selling the women and children into slavery. It was rebuilt after the destruction of Thebes, and

is mentioned by Dicaearchus about twenty years after the death of Alexander.

The worship most prevalent in Orchomenus was that of the three Graces (*χαριῆται*): there was also a temple of Dionysus in the city, and shrines of the heroes Aristæus and Minyas, with which games (*Μινυαὶ*) were connected (Strabo to Pind., *Isth.*, i. 11), and a tomb of Hesiod, at which offerings were made. In the Orchomenian town of Tegea there was a temple and oracle of Apollo. (Steph. Bz. *Τεγυρα*.)

(Müller's *Orchomenos und die Minyer*; Wachsmuth's *Hellenische Alterthumskunde*; Clinton's *Fasti Hellenici*; Thirlwall's *History of Greece*.)

**ORCHO'MENUS**, Arcadia. [ARCADIA.]

**ORCIN**, a peculiar matter obtained by Robiquet from species of lichen (*variolaria orcina*). He found that the colour of this substance is derived from the presence of a body which is white until it is acted upon by the acids and alkalis, when it becomes reddish violet. The process of preparing orcin consists in making an alcoholic solution of the lichen, and then treating it with water, which separates the fatty colouring matter, and dissolves a bitter and serous substance; this, after several solutions and evaporations, is obtained in white crystals. These crystals are green which become, as already stated, of a reddish violet colour by the action of the air and alkalis.

**ORDEAL**, from the Anglo-Saxon *ordel*. Selden derives this word from *or*, 'magnum,' and *del*, 'judicium,' which is also the derivation given by Ducange. Lynde and Bosworth derive it from *or*, privative, 'without,' and *del*, 'difference,' an indifferent or impartial judgment, a judgment without distinction of persons. The German *urtheil*, a judgment, is apparently the same word, and also a compound. (See Selden, *Notes to Eadmer*; Hickeys's *Diss. Epist.*, p. 149.)

The earliest traces of any custom resembling the ordeal is found in the book of Numbers (ch. v.), in the water of jealousy, which the Hebrew women suspected of adultery were compelled to drink as a test of their innocence.

Blackstone (*Comm. on the Laws of England*, vol. iv., ch. 1, 'Of Trial and Conviction') says:—'The several methods of trial and conviction of offenders established by the laws of England were formerly more numerous than at present, through the superstition of our Saxon ancestors, who, like other northern nations, were extremely addicted to divination, a character which Tacitus observes of the antient Germans (*De Mor. Germ.*, x.). They therefore invented a considerable number of methods of purgation, or trial, to preserve innocence from the danger of false witnesses; and in consequence of a notion that God would always interpose miraculously to vindicate the guiltless. The most antient species of trial was that by *Ordeal*; which was peculiarly distinguished by the appellation of *Judicium Dei*, and sometimes *resurrectio purgatio*, to distinguish it from the canonical purgation, which was by the oath of the party. This was of two sorts, either fire-ordeal or water-ordeal, the former being confined to persons of higher rank, the latter to the common people. Both these might be performed by deputy; but the party was to answer for the success of the trial, the deputy venturing some corporal pain for hire, or perhaps for friendship. Fire-ordeal was performed either by taking up in the hand, unhurt, a piece of red-hot iron, of one, two, or three pounds weight; or else by walking, barefoot and blindfold, over nine red-hot ploughshares, laid lengthwise at unequal distances; and if the party escaped being hurt, he was adjudged innocent; but if it happened otherwise, as without collusion it usually did, he was then condemned as guilty. However, by this latter method Queen Emma, the mother of Edward the Confessor, is mentioned to have cleared her character when suspected of familiarity with Alwyn bishop of Winchester. (Rudborne, *Hist. maj. Winton.* l. 4, ch. 1.) Water-ordeal was performed either by plunging the bare arm up to the elbow in boiling water, and escaping unhurt thereby; or by casting the person suspected into a river or pond of cold water, and if he floated therein without the action of swimming, it was deemed an evidence of his guilt, but if he sunk, he was acquitted.' Another species of ordeal was the corsned, or morsel of execration: this was a piece of cheese or bread, about an ounce in weight, which was consecrated with a peculiar form, in which the Almighty was called upon, and it was prayed that the bread might cause convulsions and paleness, and find no passage, if the man was really guilty, but might turn to health and



Coins of Bœotia.  
British Museum. Actual Size.



nourishment, if he was innocent. The corned was then given to the suspected person, who received the holy sacrament at the same time: if indeed, as some have suspected, the corned was not the sacramental bread itself. It is said that Godwin, earl of Kent, in the reign of king Edward the Confessor, on taking his oath that he had not caused the death of the king's brother, appealed to his corned, 'per buccellam deglutendam abjuravit' (Ingulphus), which stuck in his throat and killed him.

The Ordeals of water and iron are first mentioned in the 77th law of Ina. (Wilkins, *Leg. Anglo-Sax.*, p. 27.) See also the laws of Athelstan, Edward the Confessor, and the Conqueror. (*Ibid.*, pp. 60, 198, 229.)

In the 'Domesday Survey' the readiness of claimants to prove their title to land, by ordeal or by battle, occurs in a great variety of instances; as among the lands belonging to the monastery of Ely, at a place then called Photestorp, in Norfolk: 'Hanc terram calumpniatur esse liberam Vlchetel homo Hermeri quocunque modo iudicetur, vel bello vel *Jutitio*.' (*Domesd.*, tom. ii., fol. 213. See other instances, *Ibid.*, bl. 110 b, 137, 162, 166, 172 b, 193, 208, 277 b, 332.) 'Ferri candentis Judicium' (the ordeal of hot iron) is the only ordeal of the 'Domesday Survey.' The reason for this is given by Hanville (*Tract. de Leg. et Consuet. Regni Angliæ*, l. xiv., h. 1): 'in such a case the accused is bound to clear himself by the judgment of God, namely, by hot iron, or by water, according to the difference of rank, that is, by hot iron if he should be a free man, and by water if he should be a villain (si fuerit rusticus).'

Eadmer (*Hist. Novor.*, p. 48) speaks of no fewer than fifty persons of Saxon origin who, in the reign of William Rufus, being accused of killing the king's stags, were at one time sentenced to the fire-ordeal.

It is probable that the Trial by Ordeal was not discontinued in England by any positive law or ordinance, although Sir 3. Coke (9 *Rep.*, 32), and after him Blackstone (4 *Comm.*, 145), have expressed an opinion that it was finally abolished by an act of parliament, or rather an order of the king in council, in the 3 Henry III. (1219). This order is to be found in Rymer's 'Fœdera,' vol. i., p. 228; Spelman's Glossary, sub voce *Judicium Dei*; and in Selden's 'Notes on Eadmer.' Spelman however thinks that this was merely a temporary law, without any general or permanent operation, and that the Trial by Ordeal continued to a later period. This opinion seems confirmed by a reference in the 'Cal. Rot. Pat.' p. 15, to another order in council in the 14 Henry III., 'De justitiâ faciendâ loco ignis et aquæ.' As however it is only mentioned as a former custom, and not as an existing institution, by Bracton (lib. iii., cap. 16), who wrote at the end of the reign of Henry III. or the commencement of that of Edward I., it is probable that, in consequence of the judgments of councils and the interference of the clergy, the Trial by Ordeal fell into disuse about the middle of the thirteenth century (Selden's *Notes on Eadmer*); but this was long after it had disappeared from the judicial systems of most other European nations.

Blackstone, in the part of his 'Commentaries' already quoted, says, 'Purgation by ordeal seems to have been very ancient, and very universal in the times of superstitious barbarity. It was known to the ancient Greeks: for in the *Antigone* of Sophocles (v. 270) a person, suspected by Creon of a misdemeanor, declares himself ready "to handle hot iron, and to walk over fire," in order to manifest his innocence; which the scholiast tells us was then a very usual purgation.' And Grotius (on *Numb.* v. 17) gives us many instances of water-ordeal in Bithynia, Sardinia, and other places.

In Siam, besides the usual methods of fire and water ordeal, both parties are sometimes exposed to the fury of a tiger set loose for that purpose: and if the beast spares either, that person is accounted innocent; if neither, both are held to be guilty; but if he spares both, the trial is incomplete, and they proceed to a more certain criterion.' (*Mod. Univ. Hist.*, vol. vii., p. 266.)

The '*Asiatic Researches*' (vol. i., 4to. Calcutta, 1788, p. 389-404) contain a memoir on the trials by ordeal among the Hindus, by Ali Ibrahim Khân, chief magistrate at Benares, communicated by Warren Hastings, Esq., nine in number: 1, by the balance; 2, by fire; 3, by water; 4, by two sorts of poison; 5, by Coshâ, in which the accused drinks of water in which the images of the sun and other deities have been washed; 6, by chewing rice; 7, by hot oil; 8, by hot iron; 9, by Dharmach, in which an image

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named Dharma, or the genius of justice, made of silver, and another of an antagonist genius Adharma, made of clay or iron, or those figures painted respectively on white and black cloth, are thrown into a large jar, from which the accused is instructed to draw at hazard.

The Latin forms of service for the different species of ordeal, as antiently used in England, are given by Spelman in his 'Glossary,' in v. from the *Textus Roffensis*.

The reader may consult for further information Grimm's *Deutsche Rechts-Alterthümer, Gottesurtheil*.

ORDER is distinguished from *degree* in mathematical language by a purely conventional boundary. Both are terms of succession; thus an expression is of the first, second, third, &c. degree, according as its highest power is the first, second, third, &c. of the principal letter. But if another succession should occur, say one of differentiations, then the number of such successive operations is the order of the process. Thus a differential equation which contains, at the highest, the fifth power of a differential co-efficient, is said to be of the fifth degree; while if the highest differential co-efficient which occurs in it is the third, it is said to be of the third order.

There is a particular use of the word *order* in regard to quantities which increase or diminish without limit. If A and B both diminish without limit, but if A diminish without limit with respect to B [INFINITE]. A is said to be of an inferior order to B; and generally the first powers of small quantities are said to be of the first order; products of two small quantities, and second powers, of the second order; and so on.

ORDERS, HOLY. [ORDINATION.]

ORDERS OF ARCHITECTURE. [CIVIL ARCHITECTURE: COLUMN.]

ORDERS OF KNIGHTHOOD. [KNIGHTHOOD.]

ORDINARY. This term, when used in English law, commonly signifies the bishop of the diocese, who is in general, and of common right, the ordinary judge in ecclesiastical causes arising within his jurisdiction. (Lindwoode's *Provinciale*, lib. i., tit. 3.) The term is also applied to the commissary or official of the bishop, and to other persons having, by custom or peculiar privilege, judicial power annexed to their offices or dignities. Thus an archdeacon is an ordinary. A bishop therefore is always an ordinary, but every ordinary is not a bishop.

The term is derived from the Canonists, and is in common use in several European countries. Since the Lateran council, when the apostolic see assumed the power of presenting to benefices, the pope has sometimes been called by canonical writers 'ordinarius ordinariorum.' In England the probate of wills, the granting of letters of administration, the admission, institution, and induction of parsons, and several other authorities of a judicial nature, are vested in the ordinary. The *judex ordinarius* of the canon and of the later Roman law is a judge who has judicial cognizance in his own proper right, as such judge, of all causes arising within the territorial limits of his jurisdiction. He is opposed to the *judex delegatus*, or *extraordinarius*, whose jurisdiction extends only to such causes as are specifically delegated to him by some superior authority. (Ayliffe's *Parergon*, p. 309; Justin., *Novell.*, 20, c. 3, and 112, c. 31.) With reference to this distinction, it became usual to apply the term 'ordinary' to bishops, who, when acting in their judicial character in ecclesiastical causes, have strictly an ordinary jurisdiction; and we find it used in this sense by Bracton and the earliest writers upon English law.

ORDINATE is that particular rectangular Co-ordinate of a curve which is measured perpendicularly to one of the axes and not upon an axis. [CO-ORDINATE.] It is necessary to observe that though the term co-ordinate has been extended to what are called polar co-ordinates, yet the word ordinate is not separately used in the latter system. The etymology of ordinate will be found in the article cited.

ORDINATION, the ceremony by which holy orders are conferred, or by which a person is initiated into the ministry of religion, or set apart for preaching, administering the sacraments, and discharging other ecclesiastical rites and duties, public or private. In the Church of England, a candidate must be twenty-three years of age before he can be ordained deacon, and twenty-four before he can be ordained priest; must have an appointment to some cure, except he be a fellow of a college; bring letters testimonial of his life and doctrine, for three years, from three beneficed clergymen; undergo an examination in Latin, Greek, and

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theological learning; subscribe to the Thirty-nine Articles and the Liturgy; and, as bishops now almost invariably require, have graduated at one of the English universities, at Trinity College, Dublin, or at some other recognised school. No person can hold any vicarage, rectory, or benefice whatever, except he be in full orders.

A form of some kind has always been observed in conferring the priesthood. This was the case under the Old Testament dispensation; in which the family, age, and qualifications of the individual appointed, are particularly described. In the New Testament, our Lord called the twelve apostles, and sent them out—ordered them to perform the offices of religion. So likewise the apostles ordained others; and the form they adopted for setting them apart was *prayer* and the *imposition of hands*. In this manner bishops, priests, and deacons were appointed; and, for at least ten centuries, no other ceremony was used or added thereto. When the church became corrupt, this, like almost every other ordinance, shared the general perversion. It lost its primitive simplicity, and was elevated to the dignity of a sacrament. The plan was adopted of delivering to a person ordained priest the *sacred vessels*, i.e. the plate and the cup; employing with the action certain words by which he was authorised to offer sacrifice to God, and to celebrate mass. To constitute a sacrament, three things are required, *matter*, *form*, and *institution*. Ordination was evidently instituted by Jesus Christ and his apostles; but in their institution of it, it clearly wants the main essentials of a sacrament. The church of the eleventh century, in converting it into a sacrament, considered the *vessels* as the *matter*, and the *form* was the delivering them with the words:—‘Take thou authority to offer up sacrifices to God, and to celebrate masses, both for the living and the dead; in the name of the Father, the Son, and the Holy Ghost.’ Protestant churches have returned to the original method of conferring orders, and use only prayer and the imposition of hands; some sects dispense with the latter, as the Wesleyan Methodists.

The great controversy between Episcopalians and Presbyterians is, the authority by which holy orders are conferred. The former hold that bishops alone are vested with this authority; and those especially who entertain the notion of *Apostolic succession*, i.e. assert the fact of an unbroken episcopal series from the days of the Apostles to the present time, to which the power of ordaining ministers is confined and through which it descends, deny the validity of orders and even the existence of a church, where there is no bishop. The Presbyterians, on the contrary, contend that the presbytery, or a body of priests, have authority for this purpose; and that bishops and presbyters are in Scripture the same, and not distinct orders or officers. They urge that Timothy was ordained by the laying on of the hands of the presbytery; and that Paul and Barnabas were ordained by certain teachers and prophets in the church of Antioch, and not by any bishop presiding in that city. It is certain however that bishops have existed as a distinct order from the very earliest times; and though we cannot assert that they are absolutely essential, yet they evidently contribute to complete the idea of a church, and tend to its orderly and effectual operation.

Many at the Reformation held the call of the people the only thing essential to the validity of the ministry, and taught that ordination is only a ceremony which renders the call more solemn and authentic. Accordingly the Protestant churches of Scotland, France, Holland, Switzerland, &c., have no episcopal ordination. For Luther, Calvin, Bucer, Melancthon, and all the first reformers and founders of these churches, who ordained ministers among them, were themselves presbyters and no other. The following remarks on this subject appear at once liberal and judicious. They are from Burnett's ‘Exposition of the Thirty-nine Articles;’ himself an English bishop, and attached to the Episcopal form of church government. ‘If a company of Christians find the public worship where they live to be so defiled that they cannot with a good conscience join in it, and if they do not know of any place to which they can conveniently go, where they may worship God purely, and in a regular way; if, I say, such a body, finding some that have been ordained, though to the lower functions, should submit itself entirely to their conduct; or finding none of those, should by a common consent desire some of their own number to minister to them in holy things, and should upon that beginning grow up to a regu-

lated constitution; though we are very sure that this is quite out of all rule, and could not be done without a very great sin, unless the necessity were great and apparent, yet if the necessity is real and not feigned, this is not condemned or annulled by the article (the 23rd); for when it grows to a constitution, and when it was begun by the consent of a body, who are supposed to have an authority in such an extraordinary case, whatever some hotter spirits have thought of this since that time, yet we are very sure that not only those who penned the Articles, but the members of this church for above half an age after, did, notwithstanding these irregularities, acknowledge the *foreign* churches so constituted to be true churches as to all the essentials of a church, though they had been at first irregularly formed, and continued still to be in an imperfect state.’ And again:—‘Whenever God by his providence brings Christians under a visible necessity of being united without all order and joint worship, or of joining in an unlawful and defiled worship, or finally, of breaking through rules and methods in order to the being united in worship and government; of these three, of which one must be chosen, the last is the least evil, and has the fewest inconveniences hanging upon it, and therefore it may be chosen.’ (Burnett *On the Articles*; Watson's *Theological Dictionary*.)

**ORDNANCE**, a general term applied to the pieces of artillery (guns, carronades, howitzers, and mortars) used in war, on land or at sea; the name being probably derived from the *compagnies d'ordonnance*, or French Archers, instituted in 1448 by Charles VII. of France.

The wars between the emperor Charles V. and France gave rise on the Continent to the first important improvements in the construction and use of heavy artillery. According to Templehof it was then that some efforts were made to establish a system of proportions between the length, the thickness, and the calibre of ordnance; the gunpowder was improved, and that certain relations between the charge of powder and the weight of the projectile began to be established. It was not however till the beginning of the seventeenth century that artillery, which had been chiefly used in the attack and defence of fortresses, began to be extensively employed in engagements between hostile armies; but in 1632 the Austrians and Swedes together are said to have brought into the field 2000 pieces among which were 24, 16, 12, and 6 pounder guns.

An artillery capable of accompanying the rapid movements of cavalry was first systematically introduced in warfare by Frederic the Great; but the full development of the important services which are capable of being rendered by this arm is due to the Prussian general Scharnhorst, since whose time the horse-artillery, as it is called, has been considered as an indispensable requisite in the armament of every nation in Europe.

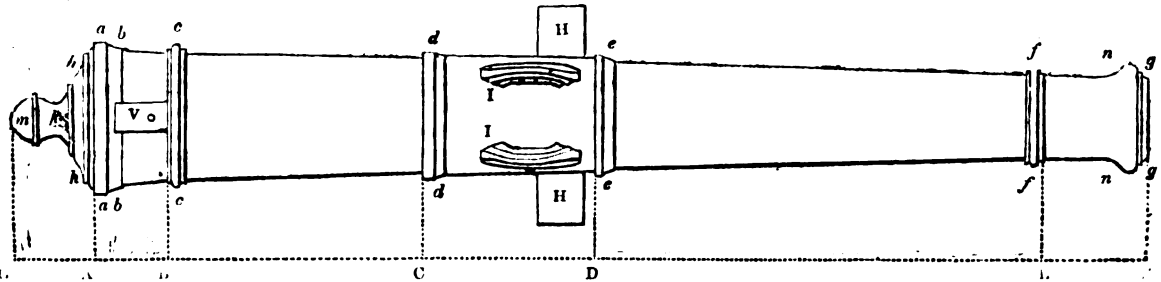
In the British service the management of the military rockets invented by Sir W. Congreve is assigned to a particular troop; and though these missiles have not been very generally employed, they have occasionally rendered considerable service. [ROCKET.]

The materials of which ordnance is formed are iron and brass; the latter being a mixed metal composed of copper and tin, in the proportion of from 8 to 12 parts of the latter to 100 parts of the former. Iron guns are stronger than those made of brass, and consequently they are better adapted to resist the effects of the long continued firing which takes place at the sieges of fortresses. Brass guns, on the other hand, being lighter, are more conveniently transported to the place to place with troops in the field, and they are strong enough to resist all the firing which can be required to be made from them in any general action. It is said that in the campaigns of the duke of Wellington, in Spain, 1400 rounds were fired in one day from brass ordnance; and that from 300 to 350 rounds were fired constantly, in the same time, from iron 24-pounder guns.

Ordnance is now cast either in loam or in dry sand; the latter material is said to be preferred because it gives the surface of the gun to be more correctly formed, and renders it unnecessary to complete the figure of the piece by the process of turning. To make the mould for casting in sand, a model or pattern of the gun is executed, in pieces of wood, or more properly of brass; these parts are placed severally within what is called the gun-box, which is of cast-iron, and consists of portions corresponding to those of the model. Between the latter and the interior surface

the gun-box the sand is then well rammed; and when the whole of the moulding is thus formed, the gun-box is taken to pieces, the several parts of the mould are fitted together, and in this state dried at a stove. Lastly, the mould being placed in a vertical position, with the breech or thicker part downwards, and its interior surface having been painted in order to prevent adhesion to the metal in casting, the melted iron or brass is suffered to flow in through a pipe at the upper extremity of the mould, on one side of what is called the dead head (a mass of metal which, in casting, is formed beyond the muzzle extremity of the gun). In 12 hours after being cast, the mould may be removed, and the gun may be bored. [CANNON.] Guns, carronades, howitzers, and mortars are all cast and bored in the same manner.

Iron guns are cast from pig-metal of different qualities,



AF is considered as the length of the gun (= 7 feet). AB is called the vent-field (= 5.5 in.). V the vent. BC the first reinforce (= 20.9 in.). CD the second reinforce (= 13.3 in.). DE the chase (= 36.8 in.). EF the muzzle (= 9.5 in.). AG the cascable (= 6.2 in.). I the dolphins or haules. II the dolphins or haules. aa is called the base ring (diam. = 11.75 in.). bb the base ring ogee. cc an astragal and fillets. dd the first reinforce ring and ogee (diam. = 9.8 in.). ee the second do. (diam. = 9.5 in.). ff an astragal and fillets (diam. at aa = 6.33 in.). gg the muzzle mouldings. hh the breech ogee and fillets. k the neck. m the button.

Nature of Ordnance.		Calibre in inches.	Length of			Weight.  cwt. qr. lb.		
			Gun in		Bore in			
			Calibres	Inches.				Calibres
Brass Guns.	13-Pounders { med. light	4.623	17.0	78.6	16.13	18	0	0
	9-ditto	4.623	13.0	60.08	12.24	12	0	0
	6 ditto { heavy med. light	4.2	17.0	71.4	16.13	13	2	0
		3.668	22.9	84.0	21.91	12	0	0
	3 ditto	3.668	19.63	72.0	19.0	9	1	2
		3.668	16.56	60.0	15.67	6	0	0
	2 ditto	2.913	22.72	72.0	22.12	6	0	0
		2.913	16.48	48.0	15.79	3	0	0
	2 ditto	2.913	12.36	36.0	11.67	8	1	0
		2.019	29.72	10.0	28.72	2	2	11
Iron Guns.	16-inch	10.0	9.0	39.0	8.86	56	0	0
	12-Pounder	8.0	11.0	39.0	10.0	39	0	0
	10-ditto	7.0	16.21	168.5	15.24	65	1	0
	9-ditto	6.41	17.8	108.6	16.73	55	2	24
	8-ditto	6.41	14.8	85.0	14.0	47	2	24
	7-ditto	5.823	12.58	108.5	13.46	50	0	16
	6-ditto	5.823	15.45	84.5	14.42	40	0	8
	5-ditto	5.292	20.4	108.0	19.22	42	0	12
	4-ditto	5.292	18.13	96.0	16.95	37	2	12
	3-ditto	4.623	23.36	108.0	22.11	33	3	24
Carronades.	12-ditto	4.623	22.06	96.5	20.81	33	0	0
	9 ditto	4.623	19.47	84.5	18.22	29	2	8
		4.2	25.71	108.0	24.4	31	0	2
	6 ditto	4.2	24.28	96.5	23.0	28	2	3
		4.2	21.42	84.5	20.13	26	0	4
	3 ditto	4.2	20.0	81.0	18.68	24	3	27
		3.668	27.81	96.5	26.4	23	0	4
	3 ditto	3.668	21.26	72.5	19.69	18	0	0
		3.668	19.63	72.0	12.25	17	0	4
	Mortars.	68-Pounders	8.05	7.70	61.72	7.70	36	0
42-ditto		8.05	5.96	38.0	5.96	29	0	0
32 ditto		6.84	7.52	52.42	7.52	22	0	0
24 ditto		6.25	7.68	47.71	7.68	17	0	0
18 ditto		5.68	7.66	43.32	7.66	13	0	0
		5.68	6.34	36.0	6.34	11	2	0
12 ditto		5.16	7.59	29.3	7.59	10	0	0
		5.16	5.45	28.0	5.45	8	1	0
6 ditto		4.52	5.78	32.36	5.78	6	0	0

The axis of the trunnions is at right angles to that of the gun, and is usually about half their diameter below the latter axis; but Dr. Gregory, in his 'Lectures on Gunnery,' recommends that it should intersect the axis of the gun, in order that the recoil of the piece in firing may be more steady. The vent is two-ninths of an inch in diameter, and it enters the bore at about eight-tenths of an inch from the bottom of the latter.

The diameter of the bore is called the calibre of the gun; this is rather greater than the diameter of the shot by which the nature of the gun is designated, and the difference between them is called the windage. [WINDAGE.]

which are melted together in order to produce a composition possessing only that degree of hardness which will permit the boring to be effected. Ordnance formed of cast-iron and of gun-metal being apt to run at the vent in consequence of the heat produced by rapid firing in action, the vent in guns of the former kind is drilled in a bolt of wrought-iron, and in those of the latter kind, in a bolt of pure copper: the bolts are then screwed into the pieces for which they were intended.

The following cut shows the form of a brass gun whose proportions are those of a heavy 6-pounder; and we have subjoined a table of the dimensions and weights of the principal natures of guns in use in the British service. The natures and uses of carronades, howitzers, and mortars have been already described under those words.

A scale of quarter degrees is graduated on the base ring, the zero line being in a plane passing through the axis of the gun and cutting the exterior surface immediately above the trunnions, and the intersection of such plane with the side of the muzzle is marked by a notch on the latter. These quarter-sights, as they are called, serve to give the gun an elevation not exceeding three degrees; and this is accomplished by lowering the breech till the division expressing the intended elevation and the notch on the side of the muzzle are in a line with the object. The axis of the gun will then be inclined to a plane passing through the object and the axis of the trunnions, in an angle equal to that which is indicated by the division above mentioned.

A point-blanc disposition of the gun is that in which the zero notch on the base ring and that on the side of the muzzle are made to coincide in direction with the object, whether this line of direction be or be not parallel to the horizon. But when a notch on the top of the base ring and one at the top of the muzzle are made to coincide in direction with the object, the gun is said to have the *line of metal elevation*. [GUNNERY, p. 493, col. 1.] The angle which the axis of the gun, in this case, makes with a plane passing through the trunnions and the object is about one degree.

For elevations greater than three degrees a tangent scale is employed; this is a brass rod which slides up and down in a groove formed in the direction of a diameter to the base-ring of the gun, and is divided into quarter degrees. In using this scale the latter is drawn up till the graduation expressing the intended elevation is at the surface of the base ring; then the breech of the gun is lowered till a notch at the top of the scale and that at the top of the muzzle are in a line with the object. The axis of the gun (allowance being made for the difference between the semidiameters of the base ring and muzzle [DRSPART]) is then inclined to a plane passing through the trunnions and the object in an angle indicated by the said graduation.

The iron employed in gun-making is now so much refined and the processes of casting and boring are so much improved, that it has been found practicable to diminish considerably the quantity of metal in iron guns, and thus to facilitate greatly their transport from place to place; accordingly iron ordnance is at present cast with much lighter proportions than formerly. So much advantage also is now obtained from the more uniform density and the more perfect sphericity of shot, that it has even been found convenient to ream up (scrape out or re-bore) the existing ordnance, as to bring each nature of gun to the next higher cal-



Thus the old iron 6-pounders have been converted into 9-pounders; 18-pounders into 24-pounders, and so on. The practice was first recommended by Colonel Paixhans, in France, and it has lately been adopted in this country.

The application of locks to naval ordnance was introduced by Sir Charles Douglas (captain of the fleet to Admiral Rodney in the action of 1782), and their efficiency has since been fully recognised. At first the locks were made with one flint only, and in the event of this becoming unserviceable the loss of time attending the fixing a fresh flint was found to be so great, that instead of renewing the flint, recourse was generally then had to the lintstock or port-fire. But this defect has been removed by the construction of a lock which carries two flints, so disposed, that on the failure of one, by simply turning the nut, the other may be brought into use. This improvement was made in 1818, by Major-General Sir Howard Douglas; it was immediately introduced in the British navy, and has since been adopted in the land-service artillery.

From experiments made in France it has been ascertained that hollow shot, being with equal weight greater in diameter than such as are solid, when fired with low charges of powder against ships, produced most dangerous breaches in their sides; and, in consequence, certain heavy iron howitzer-guns for discharging such missiles have been introduced in the French navy. Similar experiments, attended by like results, were in 1828 made in this country by the late General Millar with a short and massive 12-inch gun which he invented on the occasion. The hollow shot projected from this piece of ordnance weighed 120 pounds, and being impelled by 11 pounds of powder, producing an initial velocity of 1000 feet per second, it pierced, at the distance of 400 yards, a strong frame-work of timber, making an opening which would have seriously compromised any ship so struck. A conviction of the necessity of using these powerful arms in a future war has led the British government to adopt them in the royal navy, and now the ships of war always carry a certain number of such guns on their lower decks. It is observed however that the effect of hollow shot cannot be depended upon at a distance of more than 400 yards if the weight of the shot is but half, nor at more than 500 or 600 yards if the weight is but two-thirds, of that of a solid shot of equal diameter.

Experiments have also been made in France on the effect of loaded or live shells as they are called, when projected horizontally into ships, the fuses of the shells being regulated so that the latter may explode as soon as they have pierced the side, and it is easy to conceive that the consequences must then be most destructive. The existence of loaded shells on board of ships has been objected to on account of the danger which might ensue from the accidental ignition of their fuses, but it is replied that this danger may be avoided by keeping each shell in a separate box, or by covering the fuse with a metallic cap till the moment when it is required to be put in the gun.

**Carriages.**—Carriages for ordnance are of several kinds, according to the nature of the arm or the manner in which it is employed.

Field gun-carriages consist of two cheeks or side pieces of elm, firmly attached together by transoms and resting on the axle-tree of the wheels; the trail, or rear extremity of the side pieces, touching the ground when the gun, which lies over the axle-tree, is in a horizontal position, that is, in a state for action. Generally now however, instead of continuing the two side pieces to the rear extremity, one solid or block trail of oak is firmly attached, near the axle, to two short side pieces, the other extremity resting on the ground in the case just mentioned, or being attached by a hook to the limber when the gun is travelling. The limber is a bed, with shafts, mounted on two wheels, and carrying two ammunition boxes for the service of the gun; the horses are harnessed to the limber, and the gun with its carriage is drawn after the latter. An ammunition waggon also accompanies each piece of ordnance, and there are others always in reserve.

Field howitzer carriages and their limbers are similar to those just mentioned, but stronger, and the cheeks of the carriage are farther asunder.

Carriages of a light construction are employed for the small artillery which is used on service in mountainous countries.

The travelling carriages for siege-ordnance are made wholly of oak, and the limber carries no ammunition; the

great size and weight of the gun-carriage trail not permitting, when it rests on the limber, the boxes to be placed there. The trail of siege-howitzer carriages does not touch the ground when removed from the limber, but rests on made to run on two iron truck-wheels.

Carriages for garrison service and for the navy consist of two short cheeks or brackets, connected by transoms, they move on four truck-wheels. Garrison carriages are now generally made of cast-iron, which is more durable than wood, particularly in tropical climates. High platform timber or cast-iron are also occasionally placed at the angles of fortresses; they are made to turn at one extremity upon a vertical pivot, the other extremity traversing through ninety or a greater number of degrees. The usual garrison carriage is mounted upon this platform, and thus the gun can be fired over the parapet in any direction at pleasure.

Mortars are placed upon solid beds of wood or iron, and are made as heavy as is consistent with the power of transporting them from place to place, for the sake of steadiness when the piece is fired. The larger land mortars and their beds are removed on platform carriages. Sea mortar-beds are made of strong timber; they have a hole in the middle for receiving the iron bolt on which the bed turns round, and they are placed on strong timber frames fixed in the vessels by which they are carried.

The number of horses employed in the British service to draw artillery of the different natures is as follows:—For an 18-pounder or an 8-inch howitzer, from 8 to 10 horses. For a 12-pounder, 9-pounder, a heavy 6-pounder, or a 5½-inch howitzer, from 6 to 8 horses. For a light 6-pounder, a heavy 3-pounder, or a 12-pounder howitzer, from 4 to 6 horses. It may be observed here, that two horses can draw a weight twice as great as that which can be drawn by one; therefore the number of horses which should be applied to draw weights must be increased in a higher ratio than the weights.

Formerly two 6-pounder guns were attached to each battalion of infantry, but this practice has long been discontinued, and now all the artillery which accompanies an army into the field is formed into batteries or brigades, each invariably consisting of six pieces. The brigades of foot-artillery consist either of five medium 12-pounders and a heavy 5½-inch howitzer, or five 9-pounders and a 5½-inch howitzer, and a troop of horse-artillery is usually accompanied by light 6-pounders, besides a light 5½-inch howitzer.

Six-pounder guns were not much employed with our armies under the Duke of Wellington, as they were considered to be inferior in effect to the artillery which the French brought into action during the war; they may however be advantageously employed with a corps detached for the purpose of intercepting an enemy's convoy: but it may be observed in general, that field ordnance should be such as may take good effect against troops at the distance of 500 or 1000 yards. Twelve-pounders and even 18-pounders are necessary in the field when it is required to break down palisades or small intrenchments, to break down bridges, and the like.

The guns hitherto employed in the attack and defence of fortresses have been 12, 18, and 24 pounders: the last are used in the formation of breaches, and the others for the purpose of dismounting the enemy's artillery by direct or ricochet firing.

With respect to the quantity of ordnance which should accompany an army into the field, no precise rule can be given, as the ratio of the number of men to that of the guns in the great armies on foot during the late wars was very various; but, according to General Lespignasse, a division of 12,000 men, including two regiments of cavalry, should be attended by three brigades of horse and three of field artillery: one brigade of each kind is recommended to be with the division, another of each kind to remain with the general park of artillery, and the rest with the depot of the army.

The principle which should govern a commander in the choice of guns for naval actions is, according to Sir Howard Douglas, that with equal calibre they should possess the greatest point-blanc range; the practical maxim for using them being to close to, or within that range, and then to fire with precision and rapidity. Long guns are now preferred, in general, to be preferable to carronades for the navy, both because their fire is more accurate, and because when laid or pointed by the line of metal, the axis of the bore is more nearly horizontal in a long than in a short

gun. For the sake of obtaining a nearly horizontal direction when a ship is rolling, it is a common rule in action to fire when the vessel is nearly upright; but this is said to be subject to some limitation, for it may happen that then the ship is in the trough or hollow of the sea, in which case she will have less command over her enemy than if she were on the summit of a wave: and it is recommended that shot intended to take effect on the hull of an enemy's ship should be discharged while the side engaged is descending towards the water; or if intended to act against the rigging, it should be fired with the rising motion of the side, provided the aim be taken low.

Details concerning the exercises of ordnance for land-service may be seen in Spearman's *British Gunner*, under the word 'Exercise;' and for sea-service, in General Sir Howard Douglas's *Treatise on Naval Gunnery*, Part iii.

ORDOVIC'S. [BRITANNIA.]

ORE. [MINING.]

OREBRO. [SWEDEN.]

OREGRUND. [SWEDEN.]

OREL, a government of Great Russia, is situated between 51° 50' and 55° N. lat. and 32° 50' and 39° E. long. It is bounded on the north by Kaluga, on the north-east by Tula, on the east by Tambow, on the south-east by Woronez, on the south by Kursk, on the south-west by Tschernigow, and on the north-west by Smolensk. Its area is stated by Hassel, according to Reyman's Map, at 17,830 square miles; but other writers make it only 16,000 square miles. Schubert agrees with Hassel.

*Face of the Country; Soil; Climate.*—The country has a considerable elevation, but it contains no mountains. There are some chains of calcareous hills, and some eminences along the banks of the rivers. The soil generally consists of fine sand mixed with fertilising ingredients, and is well adapted to all kinds of grain: in some parts it is composed of a rather more compact clay and loam. There is very little unproductive land, and few heaths and morasses. Some of the rivers belong to the basin of the Dnieper, and others to that of the Wolga; but the greater part of the country belongs to the basin of the Dnieper, and slopes to the south. The principal river is the Desna, which comes from Smolensk, passes through the circles of Brjansk and Trubtschewsk, where it becomes navigable, and, having received several other rivers, runs into the government of Tschernigow. The second river is the Oka, which rises on the frontier of Kursk, and would be navigable at Orel if the stream were not obstructed by numerous mills. It receives several small rivers, by which it is so enlarged, that during the whole summer it is navigable for flat-bottomed boats of the burden of 25,000 poods (900,000 lbs.), and when the water is lower, of 15,000 poods: no part of it is obstructed by rocks. The third principal river is the Sosna, the source of which is near that of the Oka; it runs to the north-east, receives on both sides several smaller streams, and falls into the Don on the frontier of Woronez. There are no large lakes, but the province is extremely well watered by streams. It is of a very uniform temperature and very healthy. A general failure of the crops is extremely rare. The waters are frozen at the end of November, and thaw in the beginning of March.

*Natural Productions.*—Orel is one of the most fertile provinces of the empire. For corn in general the ground is never manured; but when it is greatly exhausted, it is suffered to lie fallow. All kinds of corn are cultivated, a little flax, much hemp, and in some places tobacco. Horticulture is pretty general; almost every landowner has his kitchen-garden and his orchard, in which all the culinary vegetables common in Russia are cultivated; also abundance of hops, apples, and cherries, and in some parts pears and plums. There are woods and copses in all the circles. The commonest trees are birches, alders, firs, aspens, limes, elms, and willows. Oak-forests cover the banks of the Desna, but there is so much waste that they are rapidly diminishing. The chase, though a secondary occupation, is profitable, and very generally followed by the inhabitants. They hunt chiefly the fox and the hare. Birds, especially quails, are very abundant. The breed of domestic quadrupeds is better and more attended to than in the northern provinces: the horses are a fine breed, fit both for draught and the saddle, and there are many studs, which are supplied with stallions from other countries. The oxen are large and strong, and are used for draught. The sheep furnish good wool. Swine are very numerous. The inhabit-

ants keep likewise great quantities of bees. The common domestic fowl and geese are generally kept. The mineral products are lime, millstones and grindstones, alabaster, saltpetre, and some bog-iron. No use is made of the peat which is found in the government.

*Manufactures and Trade.*—Agriculture and the breeding of cattle are the chief occupations of the inhabitants. The occasional employments of the women are spinning, weaving, and knitting; of the men, felling timber, and other work in the forests, lime-burning, stone-hewing, and saltpetre-boiling. There are no manufacturing establishments in the villages, and few mechanics. The country-people make for themselves almost everything that they have need of. There are however some iron-works, mills, &c. In the towns there are manufactories of coarse woollen cloths, linen, sail-cloth, table-linen, leather of various kinds, cordage, paper, colours, glass, earthenware, soap, &c. There are numerous brandy distilleries.

The chief articles of exportation are bar-iron, nails, steel, wire, window glass, brandy, bass mats, sacks, cordage, corn, flour, hemp, oil, some fir masts, balks and planks, tobacco, horses, oxen, tallow, butter, honey, wax, and other productions of the country. Almost all articles of foreign produce and manufactures of which the inhabitants are in want are procured from Moscow. The principal trading towns are Orel, Siäwsk (or Sewsk), Jeletz, and Brjansk.

With respect to the population, the same uncertainty exists as with regard to that of many other parts of Russia. Hassel, in 1821, states it at 1,270,000; Schubert, in 1835, states it at 1,229,000. Schnitler, in 1835, gives 1,300,000; yet he says that the official census for 1796 made it 935,000: and he shows, by the official account of several years between 1820 and 1830, that the average annual increase is above 20,000, which, says he, must have made a prodigious addition to the population since 1796. In fact it would make in 38 years, 760,000, which, added to 935,000, makes 1,695,000; and he himself makes three estimates, which give 1,553,000, 1,685,000, and 1,742,000 respectively, yet fixes on 1,300,000. We have reason to believe that the actual amount is a million and a half. The inhabitants are partly Great Russians, partly Little Russians and Cossacks; the great majority are of the Russian Greek church, and the head of the clergy is the bishop of Orel and Siäwsk. They have the character of being industrious and frugal, and are for the most part in easy circumstances; they however do not seek refinement, and dislike innovations.

OREL, the chief town of the government, is situated in 52° 56' 40" W. lat. and 36° 6' E. long. It stands on the river Oka, where it is joined by the Orlik. The houses are in general of wood, and the interior of the town is gloomy. Up to the seventeenth century, Orel seems to have been an insignificant place; but it was then fortified, and a citadel built, part of which still remains. During the wars with the Poles, and in the time of the false Demetrius, it was frequently taken and retaken. Since that time it has rapidly increased; at the census in 1783 there were only 7762 souls (i.e. males), which implies a population of 15,000 or 16,000: in 1820, there were 20,000; and the official report of the civil governor in 1830 states the population at 31,000: it is probably (in 1840) nearly 40,000. This increase may be easily accounted for. Orel is well situated for trade; it is the entrepôt for the corn of Little Russia, and the place from which Moscow draws its chief supply. Corn and hemp are sent to St. Petersburg to be exported. Other articles are wine, procured from the southern to be sold in the northern provinces, tallow, butter, honey, wax, wool from Little Russia, hogs' bristles, and leather. There are manufactories of linen, cordage, and soap. The annual fairs are very well attended. Besides the buildings belonging to the crown, there are 20 churches, two of which are of wood, 2 convents, and a bazaar. The town, which is a bishop's see and the seat of government, has a gymnasium, a district school, and a seminary for the education of priests for the Greek church. In the vicinity there are many extensive gardens.

The other principal towns in this government are Siäwsk (or Sewsk), with 5000 inhabitants, the see of a bishop, with a seminary for 400 pupils; there are manufactories of earthenware, colours, &c.; Brjansk on the Desna, with 5000 inhabitants, has a seminary, a cannon foundry, tanneries, and much trade with Kherson; Karatschew, with 6000 inhabitants; Trubtschewsk, on the Desna, an ancient town with 3500 inhabitants; Dmitrowsk has 3000 inhabit-

Kromy, 2000 inhabitants; Maloi-Archangelsk, 1500 inhabitants; Liwny, on the Sosna, 6000 inhabitants; Jeletz, on the Sosna, with 8000 inhabitants, has a great trade in iron wares and corn; Mzensk, at the junction of the Mezna and the navigable river Sudscha, has 6000 inhabitants; Bolchow, on the Nugra, is a well-built town, with 14,000 inhabitants. These 12 towns, including Orel, are the capitals of the 12 circles of the same names.

(Stein, 1820; Hassel, 1820; Hörschelmann, 1833; Schubert, 1835; Schnitler, 1835.)

#### ORELLANA. [AMAZON]

ORELLANA, FRANCISCO, the first European who traversed the continent of South America, was born at Truxillo in Old Spain, about the beginning of the sixteenth century. He was of a good family, and, like many others of the same class, went to the New World to seek the wealth which he wanted at home. He accompanied the successful expedition of Francisco Pizarro to Peru in 1531. A cacique having reported that a country existed beyond the mountains east of Quito, abounding in gold and silver, cinnamon and other aromatic productions, the love of enterprise and the greediness of the Spaniards were excited. Gonzalez Pizarro, brother to Francisco, undertook to penetrate the trackless forests and snowy mountains lying between the city and this desirable country.

Orellana attached himself to Gonzalez, and they set forward on their expedition in 1540. The natural impediments they met with were severe, and the earthquakes, thunder, lightning, and torrents of rain which they experienced, by cutting off their communications, reduced them to the greatest extremities. At length they reached the province of Zumaco, where they found the cinnamon-tree growing in great abundance. From Zumaco, Gonzalez explored the country to the east, and followed the course of a river, supposed to be that branch of the Marañon called the Napo, for 200 leagues, when the supply of roots and berries on which they had been living became so scanty, that some expedient was necessary to obtain provisions. Accordingly, Orellana was ordered to proceed down the river in the bark which they had built, and having loaded her with provisions, to return immediately, leaving the baggage behind him. Orellana went forward until he arrived at the confluence of this branch with the main stream. He found however nothing but impenetrable forests and flooded plains. Either the ambition of discovery or the utter inability of his exhausted crew to row back against the heavy stream induced him to proceed. They were put to the greatest straits; they eat their shoes and saddles, many were killed in frays with the Indians on the shores of the river, and mutinies broke out among his people, which were only quelled by the firmness of Orellana. Having by his skill and perseverance overcome all these difficulties, he reached the sea in August, 1541, having navigated this vast river above one thousand leagues. On his return to Spain he spread such wonderful reports of the 'El Dorado' that he had passed through, of the temples roofed with gold, and of the Amazons inhabiting the banks of the river, that he soon obtained numerous followers, and the king of Spain granting him extensive possessions, he returned to the river Amazon in 1549, but shortly after fell a victim to one of the diseases prevalent in the low and swampy situations of the tropics. We know nothing of the details of the countries through which Orellana passed, nor was it until lately that any persons were willing to undertake so difficult and dangerous a journey. Lieutenant Maw, R.N., performed it in 1828, and Lieutenant Smyth, R.N., in 1834.

ORENBURG, the most westerly government of Asiatic Russia, is situated between 47° and 56° N. lat. and 50° 20' and 64° 20' E. long. It is bounded on the north by the government of Perm, on the north-west by Wiätka; on the west by Cusan, Simbirsk, Saratof, and Astrachan; on the east and south by the steppe of the independent Kirghizes, and on the north-eastern extremity by Tomsk and Tobolsk. Its area, according to Schubert (with whom Arsinief and others agree much more nearly than usual), is 118,650 square miles: Hörschelmann however makes it 134,400 square miles. It is divided into twelve circles.

*Face of the Country; Soil; Climate.*—Towards the south, in the country of the Cossacks of the Ural, the government is a steppe, which is destitute of trees, and only produces the plants peculiar to saline countries. Beyond the mountains it is a plain intersected by morasses and a great number of

lakes; on this side of the mountains the surface is undulating, remarkably varied, and often very picturesque. To the north, where the Ural chain enters the government, it is called the Baschkirian Ural; the part which runs directly south, parallel with the river Ural, which it meets by making a sudden bend from east to west, is called the Gœberlin mountains, branches of which, stretching from east to west, extend into the government of Astrachan, and from what is called the Obstschei-Syrt. The base of the Ural chain is granite; the upper rocks are calcareous and quartz, sometimes bare, and covered with erratic blocks, and sometimes covered with a sufficient depth of sand and earth for the trees to take root. Immense caverns open into the interior of these mountains. The whole of the western part is fertile. The principal river is the Ural, which rises in the Ural mountains in the district of Troitsk, and forming a part of its course the western boundary between Orenburg and Astrachan, discharges itself by several mouths into the Caspian in 47° N. lat. Its entire course, which is rapid and winding, but without falls, is above 1600 miles; its breadth, which is only 60 feet at Orskaia, and 150 at Orenburg, increases to 480 feet, but the water is so shallow that it is navigable only for very light vessels. It is however a very useful barrier to protect Russia against the nomadic tribes of the steppes. Other rivers are the Kama, the Sakmara, which falls into the Ural, and the Belaia, at the mouth of which with the Ufa, the chief town Ufa is situated. There are numerous lakes, salt as well as fresh, on both sides of the Ural mountains. The Kamunisch-Samarskoi lake a properly speaking, composed of six small lakes, which sometimes form one great sheet of water 130 miles in circumference. The climate varies considerably between the north and the south; and it is much more rigorous to the east than to the west of the Ural chain. In the steppes the heat in summer is very great. The winter is generally cold, and even in summer the nights rapidly become cool. The greatest degree of heat at Orenburg is + 33° Réaumur (106½ Fahr.), and the greatest cold - 23° Réaumur (-15½ Fahr.). Whirlwinds and hurricanes are frequent, and the sudden transitions from heat to cold produce fevers and other disorders; yet it does not appear that the mortality is unusually great. The want of rain and the swarms of locusts are very distressing, especially in the south.

*Natural Productions.*—Agriculture, in which the Tartars and next to them the Russians excel, is in general flourishing, and is favoured by the goodness of the soil. The chief grains are rye, barley, oats, buckwheat, and millet. The inhabitants grow but little flax, hemp, tobacco, and vegetables. The forests are of immense extent, but there is an enormous consumption of wood in the forges, for making charcoal, for the preparation of tar and potash, and for building houses and barks. Game is abundant in the forests and the lakes abound in water-fowl. The golden eagle of the Ural may be tamed and trained for the chase. The chief wealth of the government consists in its horses and cattle. The former, which are of Tartar or Baschkirian breed, are handsome and strong; the Baschkirs and Metseherians have herds of 200, 1000, and even 2000 horses; the Russians, the Cossacks, and the Tartars, of 50 or 100. All have great numbers of oxen, goats, and more especially of sheep, of which a nomad will have from 500 to 4000, and the stationary inhabitants 400 or 500. The Christians possess great numbers of swine, and the nomades camels or dromedaries. The fishery in the Belaia and the Kama suffices for the consumption of the inhabitants; and that in the Ural is a source of considerable advantage to the Cossacks. The government possesses likewise great mineral wealth in its various mines; it produces gold in great abundance [URAL MOUNTAINS], copper, iron, and a great quantity of salt, which is procured from the mines of Iletzk, where the rock-salt is found four or five feet under the sand in beds covered with gypsum; the Cossacks however obtain their salt from the lakes. The other mineral products are asphaltum, sulphur, vitriol, marble, alabaster, agates, &c.

The Population of Orenburg, now estimated at 1,525,540, is extremely mixed; it consists of Great and Little Russians, besides some Finns, Cossacks, Tartars, Baschkirs, Teptjars, Metseherians and Calmucks, Tchouvaches, Tchermisies, Mordwins, Kissilbaches, and Armenians. The great majority are Russians; next to them are the Turks or Tartars, and the Baschkirs (about 15,000 families). Almost the whole of these ignorant, rude, and warlike people inhabit a district at the foot of the Ural chain, which is called

after them, Baschkiria. They live by the breeding of cattle and bees, by the chase, and agriculture. They dwell in the summer under tents made of felt, and in winter in villages.

**Manufactures and Commerce.**—There are few manufacturing establishments in comparison with the extent of the country, the inhabitants in general being able to provide for their own wants. The women are extremely skilful in weaving and dyeing. The working of the mines employs a great number of hands. But manufacturing industry has made great progress within the last thirty years. According to the journal published by the direction of the government, there were, in 1838, 187 different establishments, which employed above 4000 workmen, not including those in the smelting-houses and foundries of the Ural mountains, or those in the manufactory of arms at Zloutoust: 63 tanneries dressed 30,000 skins a-year; six millions and a half pounds of potashes were made in 70 establishments; there were 10 great brandy distilleries, one brewery, 7 manufactories of woollen cloth for the army, 43 tallow-melting houses, 2 candle manufactories, and 1 glass-house.

There are some remarkable facts connected with the commence of this government. It is carried on partly with the nomade tribes in the government itself, who exchange their horses, cattle, furs, carpets, and blankets of felt or wool, for English and Russian manufactures, brass, copper, and iron articles, and partly with the Kirghises and people of Bokhara, whose caravans come to Orenburg or Troitsk, the two chief commercial towns, where there are custom-houses. Through the same channel many goods are exported to Khiva, Bokhara, Taschkend, and the Kirghis steppe. The articles exported to the interior of Russia in Europe are chiefly the mineral products, many of which are sent to the ports on the Baltic. These caravans coming from Bokhara bring likewise the productions of that country, especially raw and manufactured silk and cotton, and also Cashmere and Persian shawls, indigo, Chinese goods, tea, &c. The fair of Orenburg has lost much of its importance since the merchants from Bokhara have been permitted to frequent the fair of Nischnei Novogorod. Orenburg is now only the place through which the caravans pass on their way to Europe; the Russian merchants residing there have however always opportunities to purchase goods from Bokhara, both for this government and that of Casan, while the merchandise which has been brought so far by camels is unloaded in order to be forwarded to Europe in waggons. In 1833, 14 caravans arrived at Orenburg, consisting of 2547 camels and 27 horses, with goods to the value of 3,551,198 rubles; and 13 caravans were despatched to the frontier, consisting of 4769 camels and 264 draught horses, with goods to the amount of 3,557,922 rubles. In 1838, eight caravans arrived, one of which consisted of 334 and another of 3206 camels. Twelve caravans were sent from Orenburg.

**Education and Religion.**—For public instruction Orenburg depends on the university of Casan, but education is very limited; according to the latest accounts that we have seen (1833), there were seven schools, with 30 teachers and 625 scholars, all males. The Mohammedans study at the high school of Gargali: a school was opened in 1833 at Tscheliaba, at the foot of the Ural Mountains, in the midst of the Baschkirs. The Russian clergy had also seven schools, with 21 masters and 564 scholars. The Tartars have schools attached to most of their mosques. There are two printing-offices, supported by the crown. Most of the inhabitants, the Great Russians, many Little Russians and Cossacks, and almost all the proselytes, Tscheremisses, Tschonvaches, Mordwins, &c. are of the Russian Greek religion. Most of the Little Russians and Cossacks are Rossolnicks. Of the other Christians, the Armenians and Lutherans have their churches. The Mohammedans, whose Mufti, assisted by a council, resides at Ufa, have 1714 mosques, of which 1084 are of the first class, with 2219 Imans, Mollahs, and other attendants. All the Tartars, the Baschkirs, Calmucks, Teptjars, and Metscheriaks are of this religion.

The civil government is organised like those in Great Russia, but does not extend to the Kirghises and Cossacks, who are under a military governor, whose chief business is to provide for the security of the frontier, which is defended towards the Kirghis steppe by a line of fortresses, and by the Cossacks, the Metscheriaks, the Baschkirs, and the Calmucks, who in consideration of this service are exempt from all taxes to the government. The forts on the line of the Orenburg extend from Iletzkaja-Kreposth to the river Tobol in the north, at the distance of three miles from each

other. From Iletzkaja-Kreposth southwards to Gurief is the line of the Cossacks of the Ural, defended in like manner by a long series of small forts.

ORENBURG, formerly the capital of the government, is situated in 51° 46' N. lat. and 52° 31' E. long., in a vast plain at the conflux of the Sakmara and the Ural: it is of an oval form, pretty regularly built, and well fortified. The population is stated to amount to 20,000. There are nine Greek churches, one Lutheran church and school, a military academy for eighty pupils, a great European bazaar with 180 shops in the town, and an Asiatic bazaar with 492 shops in the Kirghis territory, a league from the town, which is the depôt for the merchandise of Central Asia and of Russia. The Kirghises bring annually between 300,000 and 400,000 broad-tailed sheep, horses, skins, carpets of divers colours; the Bokharians bring gold in grains, Persian gold and silver coin, lapis lazuli, precious stones, lamb-skins of a shining black colour which are worth a ducat in Bokhara, and at Orenburg sixteen shillings English a piece. There are at Orenburg 1000 exiles, for whom there is a very well arranged workhouse. The military governor resides here.

Ufa, the present capital, a fortified town at the conflux of the Ufa and the Belaia, has 6000 inhabitants, half of whom are Tartars. The public institutions and buildings are a gymnasium, a poor-house, a lunatic asylum, seven churches, and two convents. It is the see of the bishop of Orenburg, and the residence of the Mohammedan Tartar Mufti.

(Schnitler, *La Russie, la Pologne, et la Finlande*; Stein's *Handbuch*, edited by Hörschelmann; Eversmann, *Reise von Orenburg nach Buchara*; Ermann, *Reise nach Nord Asien*, 8vo., 1833; *Reise nach dem Ural*, &c., von A. von Humboldt, G. Ehrenberg, and G. Rose—vol. i., by G. Rose; *Russian Official Journals*.)

OREOCINCLA. Mr. Gould's name for a genus of birds inhabiting the Himalaya Mountains and New Zealand. The species from the latter locality (*Oreocincla macro-rhyncha*) is nearly allied to, but differs from, *Turdus varius* of authors. In the British Museum. (*Zool. Proc.*, 1837.)

ORFA. [MESOPOTAMIA.]

ORFORD. [SUFFOLK.]

ORFORD, EARL OF. [WALPOLE, HORACE.]

ORGANIC REMAINS. By this term geologists understand the numerous reliques of vegetables and animals which occur among the stratified rocks. The same objects receive also the name of organized fossils, and, with less precision, the titles of petrifications and fossils. Some of these objects are obviously parts of animals and plants, and retain their original structure, more or less altered by chemical agencies since their sepulture in the earth; others are earthy, stony, or metallic bodies, moulded within or upon parts of animals or plants, and thus resembling those parts in external aspect, but having none of their internal organic texture. Further, we must not exclude from the notion of the 'remains of organic beings' the few cases where marks of vital action and movement occur on the surface and in the interior of rocks, such as the foot-prints of quadrupeds on the sandstones of Cheshire and Dumfriesshire, the holes made by lithophagous conchifers in the limestone of Mendip, and the perforations of the valves of conchifers by zoophagous mollusks.

A philosophical view of the bearings of this great branch of modern geological science requires the consideration of the following questions:—

1. What are the tribes of animals and plants which occur imbedded in aqueous deposits of great antiquity, or (as rather improperly termed) in a 'fossil' state?
2. In what condition are they preserved?
3. In what manner are they distributed in the earth?

#### § 1. Tribes of Fossil Animals and Plants.

Judging from published catalogues and the course of discovery, the living creation may be estimated to contain 100,000 plants, and far more than double that number of animals. In a fossil state we may say, in round numbers, that 1000 plants and 10,000 animals have been accurately discriminated and classified. The numerical proportions vary according to the groups of plants and animals selected for comparison.

In 1828, M. Adolphe Brongniart, after examining the richest collections then known of fossil plants, gave the following interesting comparative table of fossil and recent species —

Class of Plants.	Fossil.	Recent.
Agamia . . . . .	27	7,000
Cryptogamia cellulosa . . . . .	2	1,500
" vasculosa . . . . .	266	1,700
Phanerogamia gymnospermia . . . . .	57	150
" monocotyledonea . . . . .	49	8,000
" dicotyledonea . . . . .	100	32,000
	501	50,350

Or . . . . . 1 to 100

In 1830 Professor Phillips drew up some comparative tables of fossil and recent animals, which were inserted in the 'Encyclopædia Metropolitana.' One of these is subjoined:—

#### Remains of Animals.

	In the Strata.	In superficial Accumulations.	Living estimated.
Mammalia . . . . .	35	109	} 1,100
" Cetacea . . . . .	8	.	
Birds . . . . .	few	few	5,000
Reptiles . . . . .	71	.	2,100
Fishes . . . . .	183	.	5,500
Insecta . . . . .	74	.	100,000
Crustacea . . . . .	104	.	500
Annulosa . . . . .	104	.	1,000
Cephalopoda . . . . .	788	.	100
Pteropoda . . . . .	5	.	50
Gasteropoda . . . . .	880	.	3100
Conchifera . . . . .	2,026	.	1,790
Tunicata . . . . .	.	.	.
Radiaria . . . . .	278	.	1,000
Polyparia . . . . .	476	.	1,000
	6,027	109	122,100

Or . . . . . 1 to 20

The relative proportions of recent and fossil animals and plants, taken according to their terrestrial, fresh-water, or marine residence, were thus estimated by Professor Phillips in 1836 (*Guide to Geology*, 3rd edition):—

	Recent.	Fossil.	Proportions.
Terrestrial plants . . . . .	59,000	500	118 to 1
" animals . . . . .	115,500	330	350 to 1
Fresh-water plants . . . . .	100	40	2 to 1
" animals . . . . .	3,560	260	14 to 1
Marine plants . . . . .	1,000	40	25 to 1
" animals . . . . .	11,750	6,065	2 to 1

Discoveries since made show that *all* the tables referred to contain estimates much below the truth; both plants and animals have been found to nearly twice the tabular numbers (fishes, for example, in 1838, were stated by Agassiz to be 800 fossil and 8000 recent); but as the proportions are not very materially affected, we shall not attempt the difficult task of constructing new tables suited to the present amount of knowledge.

The extreme paucity of terrestrial plants and animals in a fossil state is a circumstance very easily accounted for by the analogy of modern nature; for if few of the 60,000 plants and hundreds of thousands of animals find their way by inundations or other causes to modern lakes and oceans, we have no reason to expect the remains of the antient terrestrial fauna or flora to abound in the antient marine or lacustrine sediments. We must therefore always acknowledge the imperfection of the picture which organic remains present to us of the vegetables and animals which antiently covered the early dry land of our planet. On the other hand, the large proportion which fossil shells and zoophyta bear to the corresponding recent classes (nearly as 1 to 1, if the hard parts of the recent objects are alone considered) is exactly what might *a priori* be expected in examining sediments from water; and we may confidently affirm that from data so ample (corroborated by fossil fishes already bearing a proportion of 1 fossil to 10 recent), the condition and character of the antient oceans and lakes may be in a considerable degree known.

Organic fossils bear so general an affinity to existing races, that they may all be conveniently ranked in the same great classes; generally in the same great orders and families; sometimes in the same genera, but rarely, and only in the least antient strata, in the same species. It is very common to speak of them as the 'organic remains of a former world,' but the relations which appear between the existing creation and the imbedded plants and animals are much more various than this expression implies. We shall see in another

part of this article that it would be more correct to speak of organic remains as belonging to several successive conditions of the world, all preceding and preparatory to actual state.

#### § 2. Conservation of Organic Remains.

The imperfection of innumerable specimens of fossil plants, shells, fishes, &c., is not entirely nor principally owing to the chemical and mechanical agencies which have been exerted to modify their aspect and substance; on the contrary, the broken condition of many fossil trees, and the scattered situations in which their stems, leaves, and fruits occur, and in some cases the loss of part of their structure are to be ascribed to the turbulent action which accompanied their inhumation, and to the exposure and decomposition which they had previously sustained. Among fossil bivalve shells it is very common to find the pieces separated by the decay of the hinge ligaments; not unfrequently the shells are broken; sometimes they are rolled and worn. The accidents preceded their inclusion in the rocks, and the indications are not to be mistaken of the condition of the waters in which the mollusca lived, and the rate and circumstances of the deposition of sediment.

In whatever condition buried, the remains of plants and animals have been subsequently affected both by mechanical and chemical forces: the effect of the former is evident in the compressed ammonites of Watchet, Tytherton, and Speeton, in the goniatites and pectens of Bradford in Yorkshire, and in the fishes and ichthyosaurs of Charmouth. Some of the most interesting cases of this mechanical compression are commonly witnessed among the shales and gritstones which cover coal; for the large cylindrical stems of sigillaria and lepidodendron lie flat as paper between the laminae of shale, but appear with a depressed elliptical section when they lie obliquely across the grits, and retain their cylindrical figure whenever they stand erect in the rocks.

It is an error to apply to all 'organic remains' the title of petrifications; a large proportion have undergone some chemical changes, and many have really been impregnated with stony particles; but there is a vast number of tertiary, secondary, and primary fossils which are in no true sense 'petrified.' To judge of the antiquity of organic remains by the degree of their petrification would lead to false empirical results; and, in fact, there are several examples of complete petrification of vegetable substances belonging to the actual creation and historical times. Thus the work of a Roman aqueduct near Lippe in Westphalia is Mr. Stoke's *Notice in Geological Proceedings*, 1838, is partly petrified; the wood and nuts of the hazel are petrified in a singular manner at Ferrybridge, and on the shores of Lough Neagh; while on the other hand the wood of the lias and Kimmeridge clays is still inflammable.

Some of the conditions of preservation in which fossil plants appear may be thus classed:—

1. The plant little altered; as in the brown coal formations of the Rhine, and in a particular case at Gristhorpe near Scarborough, among the oolites, where *Solenites Murrayana* of Lindley is found flexile, elastic, and with its tissues distinct. The same thing was observed by the author at Ardwick near Manchester, in the coal formation.

2. The plant carbonized to jet or coal. This conversion of the vegetable substance is very common in clays of every geological age; plentifully so in the coal formation.

3. The substance of the plant entirely removed from the place that it occupied, leaving a hollow where it was deposited. This happens in coarse gritstone, as near Leeds.

4. The cells of the plant filled with extraneous matter as carbonate of lime in *Lepidodendron Harecourtii* of the *Fossil Flora of Great Britain*, pyrites in the fruit of *Sheppey*, silica in the wood of Woburn.

The remains of the animal kingdom present a parallel series:—

1. Bones of vertebrata generally, scales of fishes, and coverings of crustacea, are often but slightly changed from their original composition. They often retain the gelatinous parts of their mass.

2. Shells, corals, and echinodermata, composed of carbonate of lime with gelatine, have in some cases (and very often among tertiary strata) not lost the whole of their gelatinous part. From this condition of little change there is every gradation observable, till (in the oolites particularly) the whole of the organic substance has been entirely removed and a cavity is left in its place. The sides of this cavity



retain the *impression* of the external surface of the coral or shell; and it not unfrequently happens that in the cavity once occupied by a shell is an almost unattached mass of stone, which filled the interior of the shell, and represents the figure of the animal, in several respects, perfectly.

3. Into this cavity carbonate of lime has been again introduced in solution, so as to become clearly crystallized in solitary rhomboids, or in a connected mass, replacing completely the gelatine and carbonate of lime which composed the original shell; in other cases silica, and, rarely, iron pyrites, fill up the vacuity.

4. The green-sand formations show abundance of examples of the impregnation of the calcareous substance of shells, corals, and echinodermata, with a siliceous infiltration.

Now the chemical changes thus briefly sketched, in the substance of plants and the hard parts of animals, are found partly dependent on the original nature of the bodies and partly on that of the rocks in which they occur. In almost all sorts of rocks, belemnites and ostracea retain their fibrous or lamellar structure; in the oolitic rocks calcareous impregnations abound, and in the green-sands most of the shells, spongiadae, &c. are siliceous.

### § 3. *Distribution of Organic Remains in the Earth.*

The occurrence of organic remains is not known to be dependent on depth below the surface of the earth or on particular height above it. Fossil plants occur in our deepest collieries, and fossil shells crown very lofty points of the Alps and Pyrenees. Yet, because of the limited thickness of the strata, and the entire absence of organic reliquiae from the granite masses below them, it is evident that at the depth of a few thousand yards below the surface, in most situations, the traces of antient life end. In like manner, because in general the *lower strata*, in which few or no organic forms remain, rise to the highest ground, many mountain ranges are almost or absolutely deficient in fossils. Upon the whole these are most numerous in the lower parts of the earth's surface, because the formations there occurring are generally of a later origin than the stratified rocks which are uplifted into mountain-chains.

In modern oceans the occurrence of marine mollusca, zoophyta, &c., in a living state, is either known or inferred to be limited to moderate depths, from 10 to 100 or 1000 feet; when therefore we reflect on the vast abundance of shells in the Silurian strata, buried beneath several thousand feet of old red-sandstone, or of the comparable phenomena presented by the mountain-limestone shells which are covered by 3000 or 5000 feet of coal strata, we see clearly in these cases the *probability* (independent of the *proof* deduced from considering the nature and position of the rocks) of the occurrence of great upward and downward movements affecting large breadths of the ancient oceans.

Shells, fishes, and polypiaria affect, while living, peculiar situations; the rocky, sandy, and argillaceous parts of the sea-bed yield radiaria, cardacea, and ostracea in very unequal abundance, and it is worth inquiry how far such relations and peculiarities can be discovered among fossil reliquiae. If antiently vegetables were swept down by inundations from the land and buried in marine or fresh-water deposits, we ought to find some correspondence between these deposits and the sediments which now, in various parts of the world, are drifted with the trees and herbs to great inland lakes, estuaries, or the open sea. This expectation is justified by observation. It is almost exclusively in arenaceous and argillaceous strata, which for other reasons geologists have inferred to be detrital deposits, that we find the specimens of terrestrial herbs and trees, mostly fragmentary, and often accumulated in irregular patches. This is well seen in the arenaceous strata of the Yorkshire coast. Again, it is principally in limestones that we find the lamelliferous corals and a large proportion of the echinodermata, and this is in accordance with observation of the analogous living races. Some of the antient limestones (as at Torquay, Aymestry, Garsdale, &c.) appear in fact to be composed of little else than the hard parts of polypiaria and echinodermata, and thus closely approximate to some modern coral reefs. Another example of this accordance of habits of life between fossil and recent groups may be taken from the ostracea, which abound remarkably in the argillaceous strata and on the mud-banks of modern seas. One fossil species (*Ostrea deltoidea*) forms *continuous beds* in the Kimmeridge clay of England and France, almost unmixed with other shells, and extending many miles near Weymouth, in North Wilts, in Yorkshire, and at Havre. In collecting fossils from the

oolitic or carboniferous systems of strata, the abundance of fossils in the calcareous parts, contrasted with the paucity of them in the sandy beds, strikes every observer, and by carefully attending to these and other cases of the definite relation which fossils present, both as to number and kind, with particular sorts of rock, geologists may hope by degrees to arrive at just views regarding the circumstances of the existence of antient marine animals, the conditions and directions under which terrestrial plants were drifted, and the manner in which both classes of fossils have been buried in chemical sediments or mechanical aggregations.

But the circumstance to which the laws of distribution of organic remains in the earth are most distinctly and constantly related, is the antiquity of the strata. This will appear from the following brief statements.

In the oldest of all the strata known to geologists, the gneiss and mica schist systems, which repose upon the unstratified granites and congeneric rocks, few or rather no traces of organic life appear. Hence it is that organic fossils appear excluded from particular geographical areas, as for example frequently from the interior parts of great mountain-ranges, which are generally composed in a considerable proportion of these antient '*primary*' strata.

On the contrary, among the more recent of the marine strata for example, the eocene tertiary strata of London and Paris, the number of organic fossils is prodigiously great. If these contrasted cases were the only ones which appeared to suggest a law that '*the number of organic fossils in the strata continually augmented from the earliest primary to the latest tertiary rocks*,' they would deserve attention; but the supposition becomes changed into exact inference by comparing successively the systems of strata on a uniform plan. The table already given in the article *GEOLOGY* and the remarks which accompany it [vol. xi., p. 148] will illustrate this point.

Such being the facts with regard to the *number* of species of organic remains in the several systems of strata, we may next inquire as to the distribution of the several *kinds* of fossil plants and animals. Taking the broadest view of the subject first, we may represent the distribution of the *classes* of plants and animals in compendious tables. The classification of animals is that used in the '*Cyclopædia of Anatomy and Physiology*,' and we include in the term '*Palæozoic*,' all the generally argillaceous and arenaceous strata between the mica schist and the old red-sandstone. The asterisks indicate affirmatively the discovery of plants belonging to the classes named in the columns above, in the systems of strata included between the same horizontal lines.

### *Distribution of the Classes of Plants.*

Systems of Strata.	Agania.	Cryptogamia cellulose.	Cryptogamia vascular.	Phanerogamia gymnospermia.	Phanerogamia monocotyledon.	Phanerogamia dicotyledon.
Tertiary . . .	•	•	•	•	•	•
Cretaceous . .	•	—	•	•	•	—
Oolitic . . .	•	—	•	•	•	—
Saliferous . .	•	—	•	•	•	—
Carboniferous .	•	—	•	•	•	—
Palæozoic . . .	•	—	•	•	•	—
Primary . . .	—	—	—	—	—	—

It is thought by some writers that true dicotyledonous plants occur in the carboniferous strata. It is perhaps uncertain whether the fossil plants of the slaty strata of the Rhine and Brittany are rightly referred by Brongniart to the Palæozoic period.

The reader will not fail to remark that the classes belonging to the columns marked † below, are represented in all the fossiliferous strata, and that they all contain *hard conservable parts*, more abundantly than any other of the classes. They are also principally *marine*, some of them exclusively so. These facts should make us scrupulous in believing that the full system of antient organic life is disclosed to us by the series of organic fossils preserved in the earth.

## Distribution of the Classes of Invertebral Animals.

Systems of Strata.	Polygastrica.	Porifera.	Polypifera.	Acalephæ.	Echinodermata.	Entozoa.	Rotifera.	Cirripoda.	Annelida.	Myriopoda.	Insecta.	Arachnida.	Crustacea.	Tusculata.	Cochleiforma.	Gastropoda.	Pteropoda.	Cephalopoda.
Tertiary . . .	•	•	•	—	•	—	•	•	•	•	•	•	•	—	•	•	•	•
Cretaceous . .	•	•	•	—	•	—	—	•	•	—	—	—	•	—	•	•	—	•
Oolitic . . .	—	•	•	—	•	—	—	—	—	—	—	—	•	—	—	—	—	—
Saliferous . .	—	—	—	—	•	—	—	—	—	—	—	—	•	—	—	—	—	—
Carboniferous .	—	—	•	—	•	—	—	—	—	—	—	•	•	—	—	—	—	—
Palæozoic . .	—	—	—	—	•	—	—	—	—	—	—	—	—	—	—	—	—	—
Primary . . .	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

## Distribution of the Classes of Vertebral Animals.

Systems of Strata.	Fishes.	Amphibia.	Reptilia.	Aves.	Mammalia.
Tertiary . . .	•	•	•	•	•
Cretaceous . .	•	—	•	—	—
Oolitic . . .	•	—	•	•	•
Saliferous . .	•	—	—	—	—
Carboniferous .	•	—	—	—	—
Palæozoic . .	•	—	—	—	—
Primary . . .	—	—	—	—	—

Fishes are the only class of vertebrata found in all the systems of strata. Reptiles begin to appear (if not in the carboniferous system) certainly in the next above. Birds and mammalia appear locally and rarely in the oolitic rocks, and we believe the amphibia (fresh-water tribes of Batrachida) are not known in strata older than the tertiaries. If, lastly, we inquire in what part of the series of aqueous deposits the remains of Man have been found, the answer furnished by modern observation is very different from the fanciful conjectures common in the seventeenth century. Then the remains of men, 'evidences of the deluge' (as Scheuchzer calls his imaginary fossil man, but real fossil salamander!), were supposed to be common in rocks of every age; now we are not able to quote a single authentic example of any such occurrence except in loose surface soil, sand, gravel, and caverns, in which, not uncommonly, pottery, fabricated bones, and other marks of rude civilization accompany the reliques of our progenitors. If this absence of the bones of men from the marine strata were the only evidence which geology had to offer concerning the comparatively late creation of man, we might excuse the singular error which from time to time is revived by speculators little acquainted with the progress of science, the error of attributing to the human race, for whom the present aspect and arrangement of the globe is adapted, the same antiquity of origin as to those numerous tribes of plants and animals which became extinct before the birth of man, and were adapted to other and earlier conditions of the planet.

We may produce a few of the proofs necessary to the establishment of this truth, by determining first, what are the degrees of analogy to existing races presented by the organic fossils of the different systems of strata. As before observed, the remains of terrestrial plants and animals occur too rarely, and in a certain sense too accidentally, in the strata of marine origin to be of much importance in this reasoning. Taking then our examples chiefly from marine tribes, we may state that in the Palæozoic strata none of the species are known to be now living, and about two-thirds of them belong to genera which are also extinct. Among these extinct genera are the whole group of Trilobites, the Clymenia, Goniatites, Orthocera, Phragmocera, &c., Productæ, and many lamelliferous corals.

All the species in the carboniferous system are in the same manner extinct, and fully half of the marine tribes belong to extinct genera, often identical with those in the

Palæozoic series. Here we find some hundreds of terrestrial plants (Lepidodendron, Stigmaria, &c.), now entirely unknown among the 60,000 which botanists are acquainted with. Nearly the same proportion of the species found in the saliferous and oolitic systems (about 40 per cent.) belongs to extinct genera (all the species being unknown in modern oceans). Among these genera we have the gigantic reptile forms, the Enaliosaurians, the Iguanodons, the Megalosaurus; the countless Cephalopoda, Ammonites, and Belemnites; many Crinoidea and Echinida, besides plants approaching to Zamia, Equisetum, and tropical ferns.

The cretaceous system in like manner contains many extinct genera (Mososaurus, Turrilites, Scaphites, Ananchytes, Marsupites, &c.), in which about 40 per cent. of the species yet found may be ranked. All the species are distinct from existing tribes.

But in the tertiary strata, which crown the series of marine deposits, a different result has rewarded the diligent comparison between fossil and recent species. The great number of shells in these deposits gives excellent means of judgment, and M. Deshayes has in consequence been able to establish very exact inferences. In the oldest of the tertiaries ('Eocene deposits' of Lyell) there occur from three to five per cent. of existing species. In those of middle age ('Miocene deposits') from 7 to 28 (averaging 18 per cent.); but in the uppermost series of tertiaries ('Pliocene deposits') from 40 to 95 per cent.

Thus by estimates, as exact as can be made, of the whole number of species, geologists are enabled to perceive clearly that the affinity between fossil and recent species of animals and plants is greatest in the most recent strata, least in the most ancient, and in general is *inversely* proportional to the antiquity of the strata. Not only man is absent from the fossil world of life, but nearly all the actual creation is wanting there, and is replaced by the relics of other and earlier creations.

By considering and comparing the organic remains which fill the successive systems of strata, we find that, as few living forms appear among the lower tertiaries, few or none of the tertiary forms appear in the lower parts of the cretaceous system: this system is in the same manner distinct from the mass of the oolites, these from the red-sandstones, the latter from the carboniferous rocks, and all from the Palæozoic groups. (For proof of this, compare the following works, namely—Murchison's *Silurian System*; Phillips's *Mountain-Limestone Districts of Yorkshire*; Smith's *Strata Identified*; Mantell's *Geology of Sussex*; Deshayes's *Tertiary Fossils*.)

Each of these systems of strata contains the reliques of animals and plants which were in existence in the sea, in fresh waters, or on the land, at or previous to the time of the production of those strata; and, by combining the evidence derived from all, we arrive at a view, incomplete indeed, yet not necessarily inaccurate, of the *succession of organic life upon the globe*.

It is perhaps a common opinion that the earliest forms of life, those which occur in the fossiliferous primary (or Palæozoic) rocks, are of simpler organization than such as belong to later periods; and a conjectural view of the succession of organic life on the globe obscurely hints at a gradual 'perfectionnement' of the animal and vegetable organizations in proportion to the elapsed time. In favour of this view, the first occurrence of fishes in the uppermost

of the Silurian strata, and the first occurrence of reptiles in the lower beds of the magnesian limestone formation, deserve consideration. But on the other hand, it is not to be concealed that the earliest fishes which do appear exhibit analogies to reptile structure, and betray no mark of inferior organization; and the earliest remains of reptiles belong to high grades of that class.

On referring to the most antient known British fossils, those few which lie in the slates of Snowdonia, we find them to consist of lamelliferous *Polypitaria* and *Brachiopoda*, such as *Lingula*, *Producta*, and *Spirifera*—a small assortment certainly, and thus perfectly in harmony with the view of the gradually increasing numerical amount of fossil forms already explained, but not such as to justify a statement of their inferiority of organization. In the next stage of organic life, the Silurian system, the fossil species amount to several hundreds (at least 600), and among them are many *Polypitaria*, many *Echinodermata*, *Brachiopoda*, and other *Conchifera*, *Gasteropoda*, and *Cephalopoda*, with *Crustacea* and *Fishes*. It cannot be said that these organizations, compared with others of the same class now living, are, in any just sense, inferior or less complex; nor do we find reason to qualify this assertion while reviewing the similar and larger series of fossils from the carboniferous system, in which *Fishes* become numerous and varied in structure.

It is needless to pursue this discussion through the superior stages of the strata, in which the introduction of *Reptiles* and the development of the several classes of animals continually augment the analogy to the existing system of

nature. The general result of this whole discussion, if we had room to pursue it, would be to establish the fact of the successive introduction of all the classes and most of the great divisions of marine animals in the successive geological periods, not by the improvement or expansion of one original general type, but by addition of *new organizations* to meet *new physical conditions* of the globe.

This important result, which presents to us a series of great revolutions in organic life anterior to the desiccation of our present land (which is the bed, or rather exhibits many successively obliterated beds, of the antient seas, with their extinct inhabitants), and adapted to the chain of physical phenomena which preceded and prepared the actual arrangements of nature, may be confirmed by a brief notice of the duration of certain extinct races. By this expression it is not meant to state or to insinuate definite periods of time, but the space occupied on a scale of successive geological events, by the whole traceable duration of particular races of animals. For this purpose we shall take two genera of *Brachiopoda* (*Producta*, *Spirifera*), four of *Cephalopoda* (*Goniatites*, *Orthoceras*, *Ammonites*, *Belemnites*), three of *Crustacea* (*Calymene*, *Asaphus*, *Glyptia*), three of *Fishes* (*Holoptychus*, *Palaoniscus*, *Tetragonolepis*), and three of *Reptiles* (*Ichthyosaurus*, *Pterodactylus*, and *Mosasauros*). The systems of strata being, as before, represented by horizontal lines, and the particular fossils ranged in vertical columns, the asterisks denote the occurrence and geological duration of the groups.

Systems of Strata.	<i>Producta</i> .	<i>Spirifera</i> .	<i>Goniatites</i> .	<i>Orthoceras</i> .	<i>Ammonites</i> .	<i>Belemnites</i> .	<i>Calymene</i> .	<i>Asaphus</i> .	<i>Glyptia</i> .	<i>Holoptychus</i> .	<i>Palaoniscus</i> .	<i>Tetragonolepis</i> .	<i>Ichthyosaurus</i> .	<i>Pterodactylus</i> .	<i>Mosasauros</i> .
Tertiary . . .															
Cretaceous . .					*	*									*
Oolitic . . .		*			*	*			*			*	*	*	
Saliferous . .	*	*			*						*				
Carboniferous .	*	*	*	*			*	*		*					
Palaozoic . .	*	*	*	*			*	*		*					
Gneiss, &c. . .															

Here then is a representation of very numerous facts known to geologists, which demonstrate that each *group* of *extinct organization*, each *genus* of such a group, each *species* of such a genus, has a definite geological range, appears at a particular point in the scale of geological events, and ceases at another point. From these facts, investigated and collected, it is a clear and positive inference that, during the period which elapsed in the production of the stratified rocks, many combinations of animals and plants—in this sense many systems of organic life—came into being and passed away, not by violent catastrophes or universal revolutions, but by partial substitutions distinctly traceable, often coincident with or consequent on changes of the strata, and more or less referrible to previous remarkable changes in the physical condition of the globe.

From such a view, which we regard as fully established in truth, the 'identification of strata' by organic remains (as geologists, following Dr. William Smith, term the employment of zoological and botanical evidence to determine the geological age of formations or systems of strata) follows as a natural and simple consequence. But in employing this powerful instrument of research, geologists must not overlook ascertained facts which limit the extent and modify the rigour of the application:—

1. The geographical area within which any one species of fossil has been found is limited, and seldom (except in the Palaozoic strata) extends beyond a few degrees of latitude and longitude. (The same thing applies to living species.)

2. The geographical range of fossil genera and larger groups is much greater, but their geological range is also greater, and the evidence which they furnish of geological age is diminished in precision.

3. Difficulties hence arise of a very serious nature where strata really contemporaneous or nearly so, but widely separated (as in North America and Europe), are to be compared. Of 100 species of fossils found in the cretaceous rocks of America, only two or three are identical with European species in the same rock.

4. In all cases where distant deposits are to be classed in age by their organic contents, a prudent geologist will not decide by what is called a *characteristic fossil*, since this may only have a local value; he will not be satisfied with a few fossils of one genus or group; he will not pronounce a positive opinion, unless several species of characteristic groups, and belonging to different organizations, are presented for examination. On such evidence, embodying the *characteristic combinations of organic life* for each geological period, a just and secure inference may rest, and thus employed, 'organic remains' become a clue to many of the darkest pages in the antient history of our planet.

**ORGAN, CONSTRUCTION OF.** We have on record several kinds of organs—the Hydraulic, the Pneumatic, the Barrel, and the Finger or Church organ.

Of the hydraulic organ we know little beyond its having been operated on in some way by water: it probably resembled the clepsydra, or water-clock, which chimed at certain hours. The pneumatic organ, whether more or less antient than the hydraulic, was certainly the parent of the present finger organ; but it was so decidedly rude in its construction, that it must always be considered as a distinct instrument. The barrel organ is a machine with little variety and no expression; it nevertheless contains many clever contrivances, and is daily receiving improvements. The present finger organ is the largest and noblest of all musical instruments; its power is that of a full band, and for delicacy and sweetness of tone it is unrivalled.

A complete and full finger organ should have *three sets of keys*, and at least *two octaves of pedals*.

The first set of keys takes the *swell*, the second the *great organ*, and the third the *choir*. The compass, as well as the size of organs, must depend upon circumstances. The German scale or compass is c c to f in alt; the English descend to a below, and in some organs as low as c c c, which, for duet and solo performances, is certainly the best. A good swell is always important to an organ, and we should recommend c c to f in alt as the compass to be



preferred. The compass of the choir is generally the same as that of the great organ. These several parts, or organs, when brought together by stops, called *couplers*, give to the keys of the *great organ* the command of *every pipe in the instrument*, the power and majesty of which are without parallel in instrumental combinations.

Figure 1 is a section of a large organ, showing the several situations of certain principal parts of the instrument, which are variously placed however by different organ-builders. A is the *swell-box*, which is usually made of deal, and the thicker the better, but it certainly should not be less than an inch and a half in thickness: it must be lined with paper or leather to deaden the tone when shut. The front is formed of *Louvre-boards*, all of which are made to move on centres; they must also be an inch and a half thick. The performer opens them by a pedal expressly employed for opening and shutting the swell. This kind of front is what is known by the name *Venetian*. B is the choir *sound-board*, or part in which the pipes of that part of the organ are placed; C is the great organ *sound-board*, which also contains its pipes; D is the *bellows*; E is the *pedal sound-board*; F is one of the front pipes, to which the wind is conveyed by metal tubes called *conveyances*; G G G are three roller-boards, one for each organ; H is a *tracker*, used with *squares* and *centres* to reach distant parts of the action; I is the *keys*; K is the *pedals*; L is the seat. The numerous things which are not indicated in this figure must be sought for in *working drawings*, as we cannot and do not pretend to give these matters a practical form.

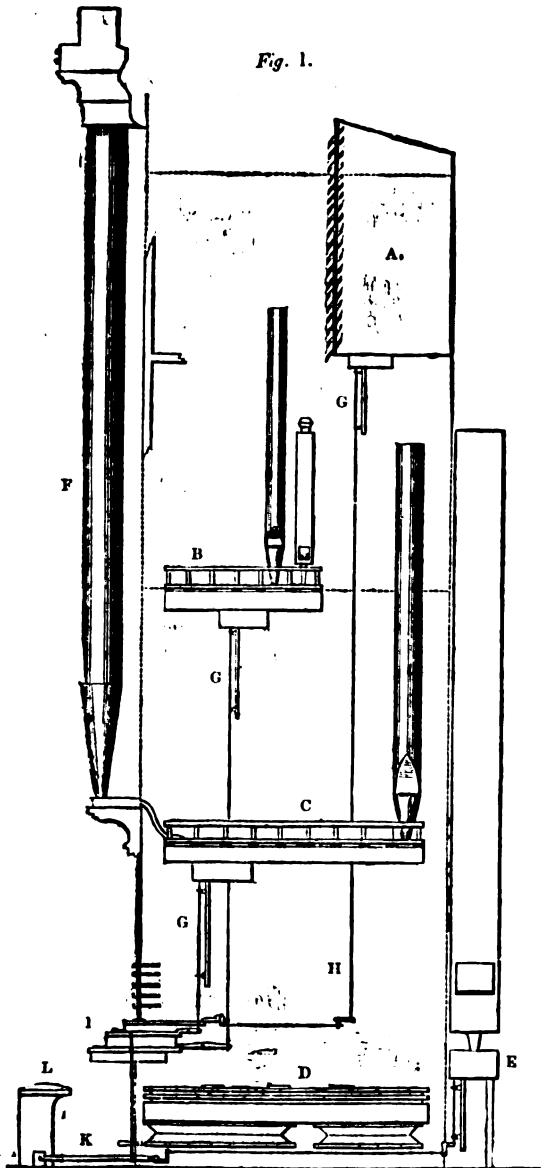


Fig. 1.

Figure 2 represents the present bellows, known under the name of *horizontal bellows*. A shows the *reservoir*; B, the deep frame through which the wind is taken; C, the part moved in blowing, called the *feeder*; DD the *registrars*, by which the equal rising of the reservoir is ensured: there are valves inside for receiving and retaining the wind, all of which are differently constructed by different builders.

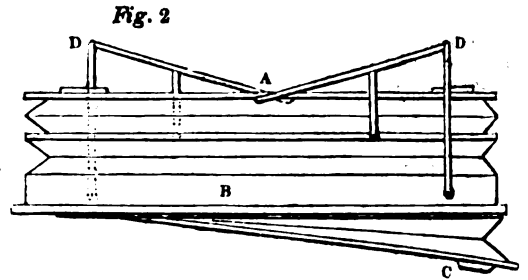


Fig. 2

Figure 3 is a perspective view of a *roller-board*: AAA the board on which the rollers are fixed; B, three pull-downs, explained below; CCC, rollers centred at each end into small blocks, in which they move; there are also one to each end, in front, connecting the rollers with the keys and the wind-chest; D, the levers which are connected with the keys and the pull-downs, and are longer or shorter as may be required; they are also *parallel* or *fan-like*, to suit their position.

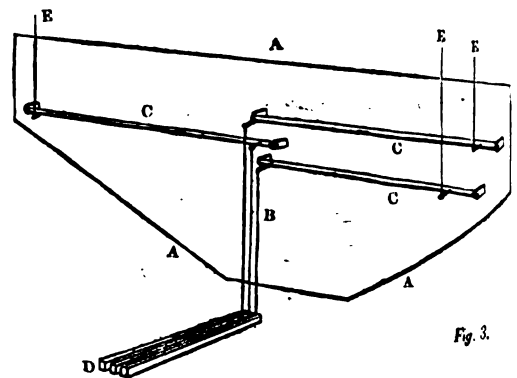


Fig. 3.

Figure 4 contains a few examples of pipes. A is a metal open pipe; F, the sounding part; G, the part called the *language*, and H, the *foot*; B is the same pipe, showing

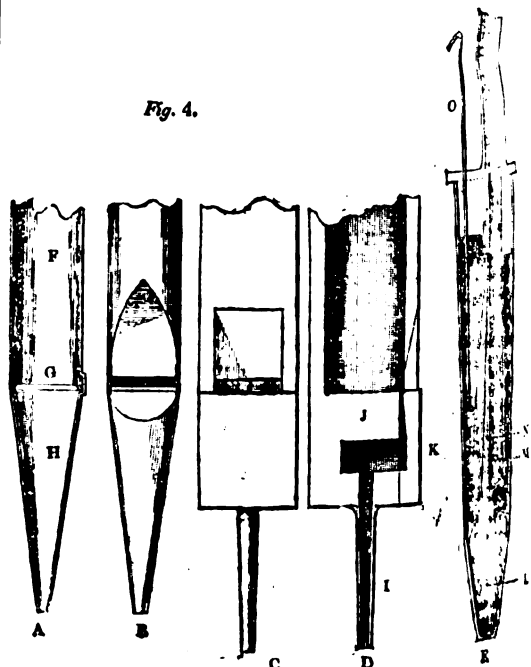


Fig. 4.

ing the *mouth* and the flattened part for *voicing*; C is a front view of a *stopped diapason* pipe; D is a section showing the arrangement of its construction; I is the *foot*; J is the *block*, and K is the *cap*. E is a section of the voice part of a *reed* pipe. L, the *foot*; M, the *mouth-piece*; N, the *reed*; and O, the *spring*. The pipe itself is made of metal composed of tin and lead; the *reed* is brass, and the *spring* is soft steel wire, about a tenth of an inch in diameter. This form of reed pipe is the basis of all the others, their differences being more in shape than in principle. When speaking of the lengths of pipes, it is generally with reference to *tuning* or *pitch* c, which is one foot long; and all c's below are doubled as we go from 1 to 2, 2 to 4, 4 to 8, 8 to 16, and 16 to 32; the last, although little used in this country, gives the highest rank to organs.

Speaking Lengths and Semidiameters of Stops.

	Open Diapason, FFF.....	Principal, and FFF.....	Fifteenth, FFF.....
	GG.....		
8 foot pipe.	CG, .... 8 feet....	CC, 4 feet.....	CC, 2 feet.....
	FF.....		
	G..... Gamut....		
4-foot pipe.	C..... Tesor ...	C pitch, 2 feet.....	G, 1 foot.....
	F.....		
	G..... Middle....		
2-foot pipe.	C..... Middle	C middle, 1 foot....	C, 6 inches.....
1 foot pipe.	C..... Above....	C above, 6 inches ..	C, 3 inches.....

⊙ Centre to the above Semidiameters, which are real dimensions. This centre must be  $\frac{1}{4}$  an inch below the first dot.

This Table shows the relative lengths and diameters of the open diapason, the principal, and the fifteenth stops, as high as c above middle c.

Quints, twelfths, and sesquialteras, all take the sizes and lengths of their proper tones in the open diapason. Trumpet and Oboe stops, being what are called *unison stops*, also take their lengths from the open diapason. The clarion, an octave stop, is measured by the principal. The bells of all reed-pipes should be as large as their places in the organ will admit of.

Middle c is the *dulciana* is an inch and a quarter in diameter and about two feet two inches long. A large size stop-diapason is seldom pure and musical. An inch and eighth wide and an inch and three-eighths deep, with thirteen inches in length, is a good scale for a middle c stop-diapason pipe in wood. Scales may be taken of larger or smaller dimensions, if desired, in which case the larger must be shorter and the smaller must be longer. Where stops are repeated, two or three of the same name, it is thought better to have them of different diameters, from an opinion that

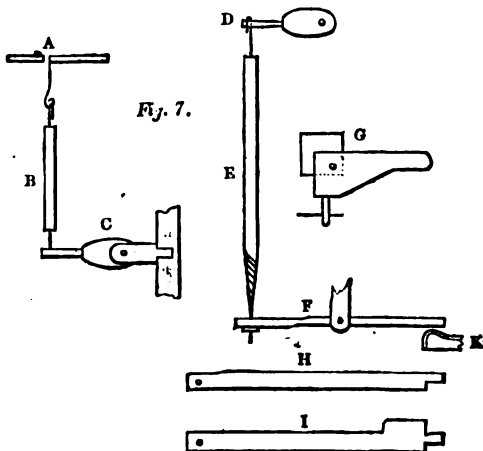
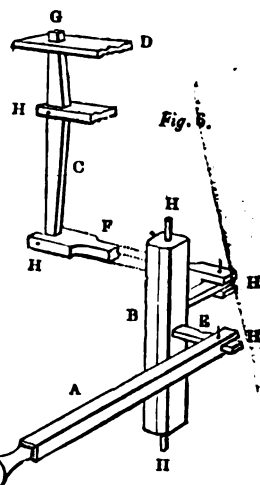
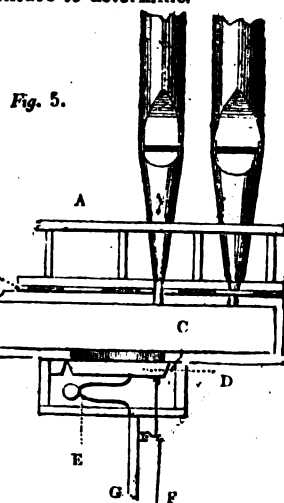
two or more unison-pipes of the same diameter affect the ear only as one pipe. There is something in this opinion, but how much we will not venture to determine.

Figure 5 is a section of a sound-board, showing some part of the mechanism. A is the rack-board, by which the pipes are held in upright position; B shows the ends of the slides; C, that part of the sound-board which contains the channels for conveying the wind to the pipes; D, the pallet or valve which is opened by the finger of the organist, through the key, the lever, the pull-down, and the roller (see figure 7); E is the spring which keeps the pallet in its place when not in use; F is the pull-down,

having a small screw and a leather button at one end, and a piece of hard bell-wire at the other; the former is fixed to the lever, and the latter to the arm of the roller; G is merely one end of the roller-board.

Figure 6 represents a draw-stop, a trundle, and a lever, all of which are used by the organist in changing a stop or slide; A is the draw-stop; B is the trundle; C is the lever; D is the slide. The draw-stop is linked to the trundle at E, the trundle is linked to the lever at F, and the lever is fitted to the slide at G. Their centres are all at H. In connection with the above, there are also pedals called composition pedals, three, four, and five to an organ.

Figure 7 represents certain small parts of the action. A is the wire by which the pallet is opened; B is the pull-down attached to it; C is the pallet-end of the roller, with its fixing to the board; D is an end view of a roller, with a pull-down and lever, all in their relative connection; E is the pull-down, and F is the lever, to which the key follows; G is a common form of a square or centre, by which the trackers are united. Trackers are pieces of pine wood,  $\frac{3}{4}$  of an inch wide, and from an  $\frac{1}{4}$  to a  $\frac{1}{2}$  thick; they are of different lengths, and may be used to any extent. The



Birmingham organ is said to have four miles and a half of trackers in it. In the cathedral organ at Canterbury, they are employed to remove the keys to a distance from the instrument, which is done to the extent of ninety feet. H is the form of a pedal-key; I is the *sharp*, and H is the *natural*. The length is about two feet; the distance from centre to centre of each pedal is two inches and a half.

Figure 8 represents an *anemometer*, or wind-gage. It is a glass tube bent as in the figure: the dark part is supposed to be water. A is the place to which it is applied in the organ, which is generally the hole for the pipe used as the pitch A or C. The pressure of the wind at B drives the water up to C, and the measure of their difference is what is called the *wind*. Some organs have more, and some less; two inches and a half is the common measure. The organ at St. Paul's cathedral is said to have as much as three inches.

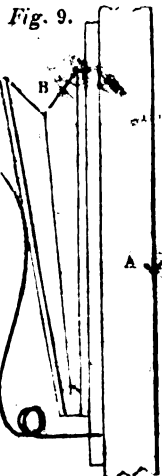
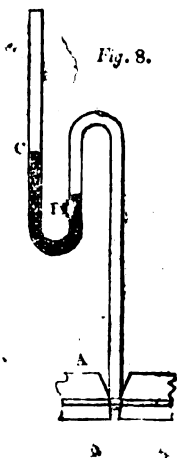
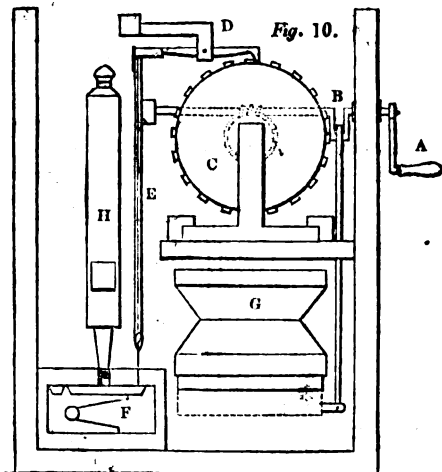


Figure 9 represents a percussion valve. It may be said to be a small bellows pressed by a spring. A is the wind-trunk, to which it is fixed; B is the valve itself, and C is the spring. The use of this part of an organ is to steady the wind, which is sometimes disturbed by sudden transitions or very rapid performance: the spring of the valve is regulated so as to give way on such occasions and to moderate their effects.

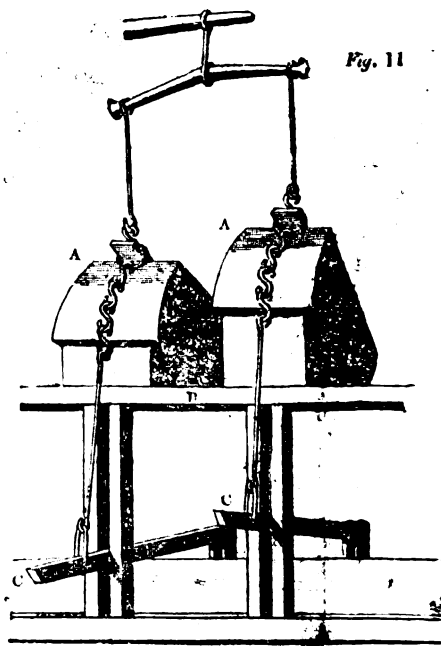
Figure 10 is a section of a common barrel-organ. A is the handle; B, the *worm* and *crank*, which move the *barrel* and *bellows*; C is the barrel on which the tunes are set. The setting is effected by brass pins and staples driven into the barrel at proper distances, accordingly as the notes are longer or shorter. D is the key, the rising of which over



the pins causes it to press down the sticker (E) into the wind-chest (F), and thus to open the pallet for the wind to enter the pipe above; G is the bellows; H, a stop-diapason

pipe. This diagram shows only one barrel, which is the common plan, but Messrs. Gray and Co. have lately introduced three, by which great risk to the mechanism is avoided and much trouble is saved. The celebrated Apollonicon, invented by Messrs. Flight and Robson, reflects high credit upon the builders, but we very much doubt its real claim to be ranked among musical instruments. Its introduction into churches should be sparingly encouraged or it will certainly endanger both the pleasure and the practice of music.

Figure 11 represents the only known form of *bellows without leather*, and this we have found in Swedenborg's 'Opera Philosophica.' AA are the bellows, which consisted each of two boxes, an upper and a lower, the upper



shutting over the lower; B, the bar on which the blower is held; CC, the levers on which he alternately stepped or jumped to put them in motion. How far we are correct in the adoption of this figure has yet to be proved. The manner of working such bellows has been sufficiently described in early writers, but their construction has been entirely overlooked, except by the above-mentioned author.

The tuning of organs is a subject on which there is much difference of opinion. Some tune from *c*, and allow of what is called the *wolf*, a discordance arising from the extreme flatness of some of the fifths. Others tune from *A*, and adopt the *equal temperament*; this latter certainly has the better reasoning in its form, as it approaches nearer to the human voice, interferes less with the band, and is more agreeable in general modulation. This subject has been minutely handled by certain curious and scientific men who have given themselves the trouble of what may be called *splitting* octaves into *smaller intervals*. But the advantages of this minuteness have not yet extended beyond the schemers themselves, for not one of their methods has yet left the cradle of its birth. The Temple organ is said to have 14 sounds in the octave; the Foundling 16, Hawke's patent 17; Loeschman has 24, and Listin's enharmonic organ as many as 59, of which 24 are on the keys, and the rest on the pedals and other contrivances. If such schemes were to become general, they would make practical men tremble; but *flat fifths* are still in use notwithstanding the enharmonic divisions, and they have nothing to fear beyond an occasional dispute on the subject.

The numbers and kinds of stops are matters not subject to rule; they vary in almost every organ, and seem more under the command of circumstances, such a space and price, than any other parts of the instrument.





